

Pharmacologically assisted laryngeal mask insertion: a consensus statement

R Moss,¹ K Porter,² I Greaves,³ on behalf of the consensus group
Faculty of Pre-Hospital Care

INTRODUCTION

Management of the pre-hospital airway can be challenging.¹ A range of techniques and adjuncts are available to the pre-hospital clinician to aid in their efforts to maximise oxygenation and support ventilation. When measures fail, management is escalated through a series of increasingly complex and invasive procedures ('the airway management ladder') with the aim of establishing a definitive airway secured with an endotracheal tube or other surgical airway. In the non-arrested patient the gold standard for definitive pre-hospital airway management is pre-hospital rapid sequence induction and tracheal intubation (RSI) delivered by a competent clinical team.

There may, however, be circumstances in which a pre-hospital RSI cannot be delivered, whether due to lack of clinical capability or lack of access to the patient. Some of these patients may benefit from advanced airway management, with the aim of promoting oxygenation, through the technique of pharmacologically assisted laryngeal mask (PALM) insertion. This technique involves sedating the trauma patient and inserting a supraglottic airway device (SAD) with the aim of improving their oxygenation and providing a degree of protection from ongoing airway contamination.

This article reports the conclusions of a consensus meeting held in April 2012. The meeting followed a full literature search which was presented to the meeting, to which there was an open invitation to all relevant stakeholders. The meeting examined the PALM technique and its indications and outlined the competencies required of practitioners performing the procedure. Representatives from across the pre-hospital community and emergency care who contributed to the meeting are

¹Department of Anaesthesia, University Hospital of North Staffordshire, Stoke on Trent, UK; ²Department of Trauma, Queen Elizabeth Hospital Birmingham, Birmingham, UK; ³Department of Emergency Medicine, James Cook University Hospital Middlesbrough, Middlesbrough, UK

Correspondence to Professor K Porter, Department of Trauma, Queen Elizabeth Hospital Birmingham, Mindelsohn Way, Edgbaston, Birmingham B15 2WB, UK; keith.porter@uhb.nhs.uk

listed in box 1. A draft document was produced reflecting the conclusions from the meeting; this document was then reviewed by the attendees prior to a final review by the key colleges, faculties and other organisations within pre-hospital care. The Royal College of Anaesthetists, although represented at the initial meeting, was unable to support the outcomes agreed by the other represented organisations.

PALM: WHAT IS IT?

The PALM technique has been described in polytrauma patients with a reduced Glasgow Coma Scale (GCS) and ongoing airway obstruction as well as airway soiling from facial injuries. The patients have often been trapped. With basic airway manoeuvres and adjuncts failing to maintain oxygenation, the patient's level of consciousness is reduced further pharmacologically, without the use of neuromuscular blockade. This allows insertion, and ongoing tolerance, of a SAD with the option of assisting ventilation if this is required.

THE EVIDENCE BASE

The evidence base for the technique is scant, with only a small series of case reports describing the technique.² However the role of SADs in both in-hospital and pre-hospital use, both routine and difficult, is well established.³

The pre-hospital use of SADs has increased with their routine use in the airway management of cardiac arrests.⁴ SADs now form part of most failed intubation algorithms following pre-hospital RSI.⁵⁻⁷ The use of SADs for in-hospital airway management has become the norm in the majority of routine anaesthetics. These devices also form an integral part in in-hospital failed airway management.⁸

The PALM technique has been adopted by a number of immediate care schemes across the UK⁹ but further evidence has not been generated, possibly due to the rarity of use of the technique.

CONSENSUS OUTCOMES

1. The PALM technique is an acceptable tool for managing the prehospital airway. The consensus group felt that, in the hands of a specific set of practitioners and

in certain circumstances, patients would benefit from the technique. It was recognised that pre-hospital airway management can be very challenging, and deeming the technique unacceptable could deprive patients of a potentially life saving intervention. It was felt that having another tool available to clinicians which could potentially improve patient outcome was important. This was despite the lack of a robust evidence base. It was felt that the technique is indicated in, and should be limited to, a very specific set of circumstances as described below.

2. The PALM technique is indicated in a rare set of circumstances

The PALM procedure is a technique which can be considered in a patient with a severely compromised airway, when all routine measures have failed. In this situation, when all other simple airway manoeuvres and adjuncts have been exhausted, when it is not possible to

Box 1 Organisations represented at the consensus meeting

Royal College of Surgeons of Edinburgh
The Royal College of Anaesthetists
The Royal College of General Practitioners
College of Emergency Medicine
College of Paramedics
Faculty of Emergency Nursing
Faculty of Pre-Hospital Care
British Association for Immediate Care—England, Wales and Northern Ireland
British Association for Immediate Care—Scotland
Joint Colleges Ambulance Liaison Committee
Directors of Clinical Care (Ambulance Service)
Air Ambulance Association
National HART Clinical Advisory Group
London Ambulance Service
Devon Air Ambulance Trust
Midlands Air Ambulance
Southwest Ambulance Service
Northwest Ambulance Service
West Midlands Ambulance Service
Northern Ireland Ambulance Service
Yorkshire Ambulance Service
Southeast Coast Ambulance Service
West Midlands Medic Response Team
Mercia Accident Rescue Service
Association for Lowland Search & Rescue
Royal Berkshire NHS Trust
ALPHA Medical
Boundtree Limited

Consensus statement

deliver a pre-hospital RSI, and when the patient remains hypoxic, performing the PALM procedure is a potentially life saving option.

3. The PALM procedure is a rescue technique

PALM is not to be considered an 'easy alternative' to a pre-hospital RSI. The procedure is located on the airway management ladder in a similar position to a surgical airway. Indeed a surgical airway is considered an alternative to the procedure and will be the rescue technique of choice if the PALM fails.

Equipment and procedure

The consensus group also outlined the necessary equipment and the manner in which the procedure should be carried out.

4. The PALM procedure should be checklist driven

It was recognised that the PALM procedure is likely to be time critical and performed in the most difficult of circumstances. However it was felt that the use of a brief checklist should be encouraged in order to avoid errors. In addition a checklist, and talk through of the procedure, might help other emergency service personnel present who are not familiar with the technique.

5. At least a second generation SAD should be used

The majority of failed airway algorithms use second generation SADs. Given this, and together with the added potential benefits of gastric drainage channels and tolerance of higher airway pressures, it was felt that devices with these designs should be used. Differing models and designs were discussed but no preference was expressed for any particular brand or design of SAD.

6. End-tidal CO₂ monitoring is mandatory

The use of end-tidal CO₂ (ETCO₂) monitoring is mandatory for post-insertion confirmation of adequate ventilation, and ongoing management of ventilation if it is required. The use of ETCO₂ monitoring prior to insertion of the SAD is to be encouraged. The minimum monitoring standards appropriate for patient sedation should also be adhered to.

7. No preference is expressed for any particular drug

Both midazolam and ketamine were felt to be appropriate drugs for use in PALM. There is little evidence to guide agent

choice, and the use of a combination of agents might be appropriate in some patients. The final drug choice must depend on clinician familiarity and experience.

8. No preference is expressed for any particular dosing regime

The original case reports describe the use of graduated doses of midazolam based on the patient's GCS. It was felt that this might be too didactic and that the required dose of drug is likely to vary according to patient physiology and condition.¹⁰

9. Flumazenil is highly unlikely to have a role in managing the PALM patient

While it was recognised that flumazenil must be available wherever midazolam is administered, in accordance with National Patient Safety Agency guidance, it was also felt that there was no role for flumazenil to reverse the effects of midazolam. Dosing of midazolam should be carried out judiciously and the well-known side effects, such as respiratory depression, anticipated.

10. The PALM procedure should only be carried out by practitioners of level 7 or above competences

The consensus group gave lengthy consideration to the level of experience and training that a practitioner performing the PALM procedure should have. The final decision recognised a number of points: the fact that this procedure has the clear potential to cause patient harm; the difficulty associated with sedating a critically ill patient with a compromised airway; and the lack of robust evidence surrounding the technique.

The PALM procedure should only be carried out by a practitioner of level 7 or above. These practitioners will be highly trained, experienced pre-hospital practitioners, working within their scope of practice, under a robust governance framework. The use of the procedure within a region must be agreed by the local ambulance service medical director. The practitioner must be skilled at managing the ongoing sedation and transfer of a critically ill patient and also competent at managing any adverse incidents. The practitioner must be capable of performing a surgical airway.

11. The availability of a trained assistant, familiar with the procedure would be advantageous

If possible, having a second clinician present, who has undergone training

and is familiar with the procedure, will aid in the checking of equipment, completion of the checklist and SAD insertion. This may help to streamline the procedure and reduce the risk of adverse events, as well as ensuring its appropriateness.

12. The training required to achieve competency in performing the PALM procedure must include in-hospital insertion of SADs, simulation training and training in the transfer of critically ill patients

It was felt by the consensus group that simulation training in SAD insertion was not sufficient to achieve competency in their use as part of the PALM procedure. Familiarity, either through routine use as part of the clinician's practice, or through training time spent inserting SADs in a supervised clinical setting is needed to learn the psychomotor skill of SAD insertion. Simulation training should play a key role in training for the PALM procedure in the pre-hospital environment. Emphasis should also be placed on the need for high quality ongoing patient care during transfer to definitive care. The ability to demonstrate retention of skills through reappraisal is also required.

The consensus group recognised that satisfying these experience and training requirements may restrict the technique to a limited number of clinicians. It was felt that this restriction is appropriate at this time given the lack of evidence surrounding the technique.

13. Data should be collected and collated at a national level for all patients who receive the PALM procedure

The consensus group highlighted the need for new evidence to help guide future recommendations regarding PALM. In order that valuable evidence for the technique can be generated, and given the rarity of its use, the group felt that all clinicians performing the technique should contribute every case to a centrally held national database.

CONCLUSIONS

This consensus statement enables the PALM technique to become a recognised tool for pre-hospital practitioners faced with life-threatening airway compromise. It sets out the rare circumstances in which this rescue technique could be employed and it describes the experience and training needed by a clinician performing the procedure.

It is hoped that, by generating an evidence base regarding this technique, future decisions regarding the PALM procedure's position in pre-hospital airway management can be more clearly defined.

Contributors RM was the originator of the manuscript, JP was the consensus facilitator and IG provided an overview.

Funding Faculty of Pre-Hospital Care.

Competing interests None.

Provenance and peer review Commissioned; internally peer reviewed.

► Additional material is published online only. To view please visit the journal online (<http://dx.doi.org/10.1136/emj-2013-203215>)

To cite Moss R, Porter K, Greaves I, *et al.* *Emerg Med J* 2013;**30**:1073–1075.

Received 17 September 2013

Accepted 23 September 2013

Emerg Med J 2013;**30**:1073–1075.
doi:10.1136/emj-2013-203215

REFERENCES

- Schmid M, Mang H, Ey K, *et al.* Prehospital airway management on rescue helicopters in the United Kingdom. *Anaesthesia* 2009;**64**:625–31.
- Mason AM. Prehospital use of the intubating laryngeal mask airway in patients with severe polytrauma: a case series. *Case Rep Med* 2009. doi:10.1155/2009/938531
- Verghese C, Brimacombe J. Survey of LMA usage in 11,910 patients—safety and efficacy for conventional and nonconventional usage. *Anesth Analg* 1995;**82**:129–33.
- Deakin CD, Clarke T, Nolan J, *et al.* A critical reassessment of ambulance service airway management in prehospital care: Joint Royal Colleges Ambulance Liaison Committee Airway Working Group, June 2008. *Emerg Med J* 2010;**27**:226–33.
- Grier G, Bredmose P, Davies G, *et al.* Introduction and use of the ProSeal laryngeal mask airway as a rescue device in a pre-hospital trauma anaesthesia algorithm. *Resuscitation* 2009;**80**:138–41.
- Timmermann A, Russo SG, Rosenblatt WH, *et al.* Intubating laryngeal mask airway for difficult out-of-hospital airway management: a prospective evaluation. *Br J Anaesth* 2007;**99**:286–91.
- Le Cong M. Flying doctor emergency airway registry: a 3-year, prospective, observational study of endotracheal intubation by the Queensland section of the Royal Flying Doctor Service of Australia. *Emerg Med J* 2012;**29**:249–50.
- Henderson JJ, Popat MT, Latto IP, *et al.* Difficult Airway Society guidelines for management of the unanticipated difficult intubation. *Anaesthesia* 2004;**59**:675–94.
- British Association for Immediate Care (BASICS) Census, 2011.
- Rapid Response Report: NPSA/2008/RRR011: Reducing risk of overdose with midazolam injection in adults.



Pharmacologically assisted laryngeal mask insertion: a consensus statement

R Moss, K Porter, I Greaves and on behalf of the consensus group
Faculty of Pre-Hospital Care

Emerg Med J 2013 30: 1073-1075
doi: 10.1136/emered-2013-203215

Updated information and services can be found at:
<http://emj.bmj.com/content/30/12/1073>

These include:

References

This article cites 7 articles, 3 of which you can access for free at:
<http://emj.bmj.com/content/30/12/1073#BIBL>

Email alerting service

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Topic Collections

Articles on similar topics can be found in the following collections

[Coma and raised intracranial pressure](#) (152)
[Trauma](#) (999)

Notes

To request permissions go to:
<http://group.bmj.com/group/rights-licensing/permissions>

To order reprints go to:
<http://journals.bmj.com/cgi/reprintform>

To subscribe to BMJ go to:
<http://group.bmj.com/subscribe/>