# Awake airway control in patients with anticipated difficult mask ventilation

## INTRODUCTION

Awake intubation is considered a technique of choice in anticipated difficult airway, similarly "awake airway control" in anticipated difficult mask ventilation (DMV) should be considered to maintain continuous oxygenation. Based on the practice guidelines for management of difficult airway by the American Society of Anaesthesiologists task force, El-Orbany and Woehlck[1] recommend the use of oropharyngeal airway (OPA) and nasopharyngeal airway (NPA) as an adjunct to optimize DMV. Authors suggest that in patients with predicted DMV placement of the NPA can be achieved prior to induction of anaesthesia without patient discomfort to optimise face mask ventilation following induction of anaesthesia.

## DISCUSSION

In contrast to OPA, NPA can be used even in patients with an intact gag reflex, trismus and oropharyngeal trauma.[2,3] Use of NPA in maintaining airway during recovery from anaesthesia when reflexes are intact is beyond doubt. Similarly, once the NPA is already secured under awake conditions crucial oxygenation and face mask ventilation can be continued without interruption in DMV scenario. With the NPA in place the operator can continue with 2 - Person face mask ventilation while performing chin lift, jaw thrust and continuous positive airway pressure. If face mask ventilation is not possible one should proceed to the second step in DMV algorithm and administer a muscle relaxant.[3] If ventilation is still not possible a supraglottic airway device (SAD) should be inserted without wasting crucial time [Figure 1]. In this manner, at no point of time oxygenation and ventilation will be interrupted except when face mask is removed for SAD insertion.

OPA insertion is considered when facemask ventilation is not possible after induction and many times the measured OPA size is inappropriate when positioned in patient. With the result, oxygenation has to be discontinued to change and re-insert OPA and in the process crucial time is lost. Insertion of NPA in awake patient has definite advantages; firstly patient takes part in choosing the correct size of NPA. A single puff of 10% lidocaine sprayed into the anterior nares makes insertion comfortable. Absence of grimace and easy passage of a lubricated NPA would ensure that

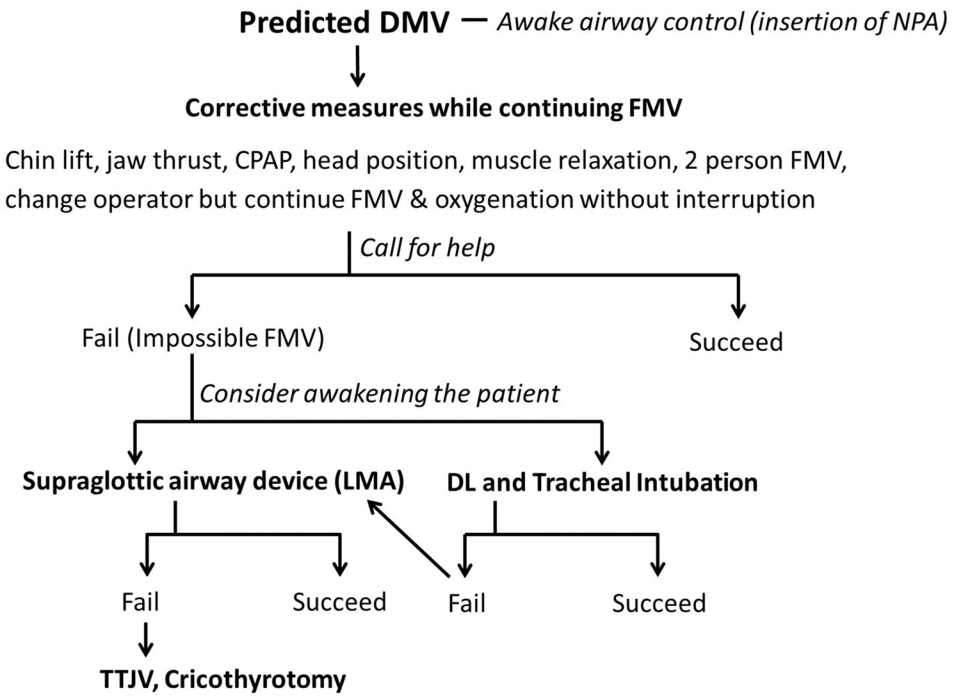


**Figure 1:** Flow chart of management steps in difficult mask ventilation. DMV = Difficult mask ventilation; FMV = Facemask ventilation; CPAP = Continuous positive airway pressure; LMA = Laryngeal mask airway; DL = Direct laryngoscopy; TTJV = Trans-tracheal jet ventilation

it is of the right size. However, if the patient feels the discomfort during insertion one size smaller NPA should be chosen and passed into the nasopharynx without using undue force. Size of NPA can be gauged according to the patient's comfort in this manner. Such a strategy will actually help to reduce the possibility of nasal mucosal trauma and consequent bleeding, which is a concern if the device is placed following anaesthetic induction. Secondly, length of NPA to be inserted can be guided by patient's spontaneous respiration. Insertion length can be adjusted to a mark where the breath sounds are best heard and confirmed by attaching end tidal carbon dioxide monitor on to the NPA with a 15 mm connector. This step ensures that NPA is appropriately positioned and is not inserted too far beyond the glottis.

In children, NPA rarely causes laryngospasm, even if it is inserted during light levels of anaesthesia. Ordinary uncuffed endotracheal tubes are most useful. The advantage is the possibility to connect the anaesthetic circuit directly to the NPA when in place. The authors recommend use of suction catheter as a guide, over which the NPA is passed through the nose, to avoid bleeding.[4] The size of the NPA should be smaller than when used for endotracheal intubation. Size 3.0 is appropriate in new-borns and NPA more than 4.5 or 5.0 are not necessary for this purpose even in larger children. The optimal insertion depth is estimated by listening to the breathing sounds in the NPA. In the 1st year of life, this depth is 8 ± 0.5 cm and in the 2nd year it is 8.5 ± 0.5 cm.[5] NPA is also a useful device in difficult upper airways or in a case of difficult face mask fit. Ventilation is possible through the NPA even if the mouth and nose are closed manually. NPAs are generally well-tolerated by conscious children and used in the management of children with congenital maxillofacial abnormalities, syndromic craniosynostosis,[6] mid-facial hypoplasia or to support the upper airway post-trauma or surgery.[7] Difficult Airway Society and Association of Paediatric Anaesthetists of Great Britain and Ireland recommend use of OPA as step B in children between 1 and 8 years with DMV during routine induction.[8] The likely causes of DMV suggested are light general anaesthesia, laryngospasm and gastric distention. Under such conditions insertion of OPA is likely to further aggravate the situation by stimulating the airway structures. Instead NPA is a better adjuvant to be recommended in step B, which is better tolerated by all sets of patients.

Some authors have suggested that tube length and not its width is more important for appropriate sizing of an NPA in a particular subject.[9] Stoneham observed that the ideal position of the distal end of the NPA to effectively address upper airway obstruction should lie approximately 10 mm above the epiglottis.[10] Such placement ensures separation of the soft palate from the posterior wall of the oropharynx, without the device passing into the larynx aggravating cough or gag reflexes or passing anterior to the larynx into the vallecula, where paradoxical airway obstruction can occur owing to the lumen of the NPA pressing against the soft tissues.

Correct insertion length of the NPA can be adjudged by observing capnographic tracings attached to the proximal end of the NPA prior to induction after manually closing the other side nostril and mouth. Admittedly there is a possibility that in some cases this strategy may not be foolproof to effectively separate the soft palate from the posterior wall of the oropharynx, however this is rare because once the NPA is appropriately chosen its length will be adequate to go beyond the soft palate. While the sizing chart based on Stoneham's work could be an alternative, it needs further validation in our patient population.

## CONCLUSIONS

Placement of an NPA prior to anaesthetic induction can help to provide patent airway in a patient with predicted DMV. Authors suggest training and airway algorithms should incorporate methods of pre-emptive and safe placement of airway adjuncts such as the NPA in selected patients who are at risk of DMV following induction of anaesthesia.

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