The Use of LMA in Newborn Resuscitation
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INTRODUCTION
At birth, numerous physiologic changes must occur for a fetus to successfully make the transition to a neonate. Despite the complexity of this process of adaptation to extrauterine life, of approximately 3.5 million babies born annually in the United States only 6% of newborns require advanced life support in the delivery rooms. In a 1991 survey of midwestern community hospitals routine involvement of anesthesia personnel in neonatal resuscitation was noted by 31% of respondents.

RESUSCITATION OF A NEWBORN
RESUSCITATION OF A NEWBORN CAN BE DIVIDED INTO 4 MAJOR STEPS
1. Initial stabilization and evaluation:
This consists of drying, positioning the neonate under radiant warmer to minimize heat loss and suctioning of mouth and nose (rachael suctioning if meconium present). This should only take approximately 20 seconds

2. Ventilation
The second step (within 20-30 second of birth) is assessment of neonatal respiration. If the baby is apneic or has gasping respiration, begin positive pressure ventilation immediately at a rate of 40-60 breaths per minute with 100 % oxygen.

3. Chest compression

4. Administration of medications and fluids.
The majority of infants requiring any resuscitation will respond to the first two steps. In almost all depressed newborns PPV is all that is required to establish oxygenation and a heart rate of above 100 beats /minute).

VENTILATION
Airway management during neonatal resuscitation is currently achieved either with a face mask (FM) or tracheal tube (TT). To establish effective ventilation after birth, the neonate must generate an opening pressure of 20-40 cm H20. Alternatively when PPV is started peak inspiratory pressures of 30-40 cm H20. or higher (depending upon the age, maturity of the neonate and lung compliance) must be generated for initial lung expansion. The pressure of subsequent breaths ranges from 15-20 cm H20. in the neonates with normal lungs.

Bag and mask ventilation can occasionally be difficult and tracheal intubation may be impossible due to lack of skill or the presence of severe congenital abnormalities. Now we have to our advantage a potential third option that bridges the gap between the FM and TT.

There are lots of inherent problems associated with bag and mask ventilation, which include:

Indications for Endotracheal intubation are:

Problems Associated with Endotracheal Intubation are

USE OF LMA IN NEONATES
There are many studies now published regarding the successful us of LMA in children. the experience with the
LMA in infants though is very limited. The LMA was designed for use in adults, however, cadaveric studies in infants demonstrated that despite the anatomic difference between adult and pediatric airways, the design of the LMA would not require modification for use in infants. The size 1 LMA is a smaller but identically shaped version of the adult model and is recommended for use in infants weighting 2.5 kgs to 6.5 kg.

**INSERTION OF LMA IN NEONATES**

The size 1 LMA can be inserted in one of the two ways either in the standard fashion, with the aperture facing anteriorly, according to the manufacturer’s instructions, or in reverse with the aperture facing the roof of the mouth turning the LMA through 180° on reaching the posterior pharyngeal wall. Once the LMA is inserted, the cuff is inflated with 2-4 ml air.

Both the techniques provide similar success rates in achieving a clinically good airway. Insertion is successful in more than 90% of neonates on the first attempt after minimal expertise, a finding consistent with the finding in adults.

**USE OF LMA IN NEONATAL RESUSCITATION**

Now we have to our advantage the LMA, a potential third option, that bridges the gap between the FM and TT.

Denny et al. first reported using the LMA to resuscitate a term newborn for emergency tracheotomy when ventilation of the lungs by bag and mask was inadequate and tracheal intubation proved impossible. Other case reports have shown the successful use of the LMA in resuscitation of newborns with congenital airway abnormality under the inadequate ventilation and difficult intubation scenario.

Paterson et al. and Brimacombe published their data using size 1 LMA in neonatal resuscitation, in 21 and 40 neonates respectively. Both authors achieved a very high success rate in achieving a good clinical airway and positive pressure ventilation.

Time required for LMA insertion: Paterson et al. showed an average time of insertion to be 8.6 seconds. In all the published data most of the insertions were successful in less than 20 seconds.

**EFFICACY OF RESUSCITATION**

In both the studies 95-100 % of the neonates were successfully resuscitated. The pink up time and improvement of heart rate was approximately 30 seconds. In most of the cases effective resuscitation of the neonates took 1-2 minutes.

The LMA in all cases provided a clinically patent airway for PPV, CPAP and spontaneous breathing. The mean time for PPV and CPAP was 80 seconds and 55 seconds respectively, till the spontaneous ventilation returned and LMA was removed. Only one failure to ventilate situation was observed by Brimacombe.

Advantages of LMA over bag and mask ventilation

Paterson et al. did not observe any evidence of gastric distension during resuscitation procedure

Advantages of LMA over TT

Tests on neonatal intubation training models have shown that midwives and junior doctors can obtain a clear airway more rapidly with LMA than TT and with fewer failures.

There has been a word of caution added by Mawer and Williams about the use of LMA in unfamiliar hands who are not competent in endotracheal intubation and resuscitation.

Limitations with the use of LMA

**CONCLUSION**

A common consensus among most of the authors is that LMA is a potential valuable adjunct for the management of neonatal airway. They also agree that further large multicentre studies are required to evaluate the precise role of LMA in neonatal resuscitation and to decide what level of initial and continued training is needed.

Finally it has been suggested that their use for the time being should be restricted to the staff who are familiar with and competent in their insertion and all doctors involved in airway management during resuscitation should become familiar with the LMA.

Guideline VII of the American society of Anesthesiology Guideline for Regional Anesthesia in Obstetrics states: “The primary responsibility of the anesthesiologist is to provide care to the mother. If the anesthesiologist is also requested to provide brief assistance in the care of the newborn, the benefit to the child must be compared to the risk to the mother.”

**References**

1. Emergency Cardiac Care Committee and Subcommittees,
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