# ORIGINAL ARTICLE

## EXPANDED ROLE OF LMA IN MINOR OBSTETRIC PROCEDURE: A PROSPECTIVE STUDY

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**ABSTRACT: INTRODUCTION:** The Laryngeal Mask Airway (LMA) has been used extensively to provide a safe airway in spontaneously breathing patients who are not at risk from aspiration of gastric contents. The increased risk of aspiration in Obstetric population was initially considered as a relative contra indication for LMA usage. But LMA proved to be safe in this subgroup and in fact significantly decreased tidal volume was noted during IPPV with a decreased the risk of aspiration. **METHOD:** This is a prospective study, performed in Niloufer Hospital for Children & Women from June 2011 – January 2014 over a period of 30months. We studied the ease of insertion of single use ILMA and associated complications in 35 ASA 1 obstetric patients. **RESULTS:** The mean age of the patients was 27.4 years. The mean BMI was 28.4 kg /$m^2$. 21 patients were admitted for cerclage (60.0%), 5 Bartholin's abscess (14.28%), 6 cases of manual removal of placenta (17.14%), 3 cases of vescicular mole for evacuation (8.57%). The duration of anesthesia ranged from 20-40 min with a mean duration of 19 minutes. The first time insertion rate was 88.57%, 31 out of 35 patients had the LMA inserted in first attempt. 4 patients needed reinsertion. None of the patients had aspiration or other complications associated with LMA. There were no failed insertions. **CONCLUSION:** We conclude that the LMA is effective and safe for in carefully selected ASA 1 pregnant patients in the hands of experienced Anesthesiologist.
**KEYWORDS:** LMA, Obstetric patients, Anesthesia.

**INTRODUCTION:** The anticipation of difficult airway is more in obstetric than in the general population (1: 300 in OB vs.1: 3000 all patients). The relative risk of case fatality during GA is 16 times more than that for regional anesthesia.[1] The risk of aspiration was well recognized with Mendelson's documentation of gastric regurgitation and pulmonary aspiration in parturients under general anesthesia. The risk of aspiration is 1in 400-500 in Obstetrics versus 1 in 2000 in all surgical patients.[2] The awareness of risks of general anesthesia, the associated difficult and failed intubations in obstetric population, the development of 'Failed Intubation Drill' by Tunstall, improvement in the regional anesthesia techniques have all led to the decrease in the institution of routine endotracheal intubations even in the situations of obstetric emergencies. This in turn has decreased the experience and training in performing endotracheal intubations in obstetric anesthesia. The Laryngeal Mask Airway (LMA) is a recognized part of ASA Difficult Airway Algorithm. LMA has been found to be a life saving emergency airway/ventilatory device in obstetric patients undergoing emergency caesarean section with the CI/CV scenario.[3] In the present study we studied the use of LMA in elective/ semi elective minor obstetric procedures.

**METHOD:** This is a prospective study done on 35 patients undergoing minor obstetric procedures like cervical encirclage, manual removal of retained placenta, episiotomy or perineal tear suturing, and for the minor non-obstetric procedures like abscess drainage in pregnant patients admitted in Niloufer Hospital for Children and Women over a period of 30 months from June 2011 to January 2014.

**DEFINITIONS:**

Insertion of LMA is defined as First time insertion when the insertion was easy with proper sealing of the glottic inlet as evidenced by maintenance of adequate oxygenation and ventilation.

A failed insertion is defined as improper or traumatic insertion of LMA or failure to maintain adequate oxygenation or ventilation even after 2attempts of LMA insertion, necessitating removal of the device.

Hypoxia is defined as fall in saturation to less than 94% on oxygen and nitrous oxide in spontaneously breathing patients.

Complications are defined as difficult or traumatic insertions, failed insertion even after second attempt, difficulty in maintaining oxygenation and ventilation, incidents such as laryngospasm, breath holding, coughing over LMA, gastric distension and any evidence of aspiration or regurgitation during the procedure.

**PROCEDURE:** Standard protocol was followed in all the 35 patients. All the patients were of ASA 1. Patients with associated comorbidities are excluded from the study. NBM status for solids for 6hrs maintained. All the patients received antiemetic prophylaxis with Ranitidine and Metaclopramide.

After shifting to the operating theater standard monitoring of Pulse oximeter, NIBP, ECG were connected. Ringer lactate started as IV fluid. Preoxygenation with 100% oxygen was done in all the patients for 3minutes. Anesthesia induced in supine position with a wedge under right hip. The patients were given premedication with Glycopyrrolate 0.2mg and Ondensetron 4mg IV. Fentanyl 2ug/Kg IV was given for analgesia. All the patients were induced with Propofol 2mg/Kg titrated to the need of the patient. Routine cricoid pressure was applied in all the cases from the beginning of induction. The adequate depth of anesthesia was ensured with 50:50 Oxygen: Nitrous oxide and 2% Sevoflurane. The patient's head was placed in sniffing position. Size 3 LMA lubricated with gel lubricant was introduced, cuff inflated, bilateral air entry confirmed and the LMA connected to the circuit. The patients were allowed to be in spontaneous ventilation. Adequacy of oxygenation and ventilation were noted by pulse oximeter and chest movements and auscultation. Any excessive leak or gastric distention was noted. Once the adequacy of Oxygenation and ventilation were established LMA is fixed with a tape. Patient is allowed to be put in the lithotomy position. The depth of anesthesia is maintained with oxygen, nitrous oxide, sevoflurane and rescue doses of boluses of 3-5ml IV Propofol.

The number of times the LMA is inserted is also noted. Effective insertion is defined as adequate maintenance of oxygenation as evidenced by pulse oximeter, auscultation of breath sounds, and adequate chest movements transmitted to the reservoir bag. The LMA was removed at the end of the procedure when the patient is awake and is able to respond to the commands.

All the patients were monitored for 2hours in the postoperative ward for any signs of respiratory compromise.

**RESULTS:** The maternal age at the initial presentation ranged from 21 to 32yrs with the mean age of 27.4 years. 10 out of the 35 patients had BMI >30. The mean BMI was 28.4 kg /$m^2$. We had 21 patients admitted for cerclage (60.0%), 5 cases of Bartholin's abscess (14.28%), 6 cases of manual removal of placenta (17.14%), 3 cases of vescicular mole for evacuation (8.57%). The duration of anesthesia ranged from 20-40 min with a mean duration of 19 minutes. First time insertion success rate was 88.57%, 31 out of 35 patients had the LMA inserted in first attempt. 4 patients needed reinsertion. All the patients were given cricoids pressure at the time of insertion. Cricoid pressure needed to be temporarily released in 3 of the patients to facilitate proper insertion of LMA. Ventilation was adequate in all these spontaneously breathing patients as evidenced by the chest movements and transmission of respiratory efforts to the reservoir bag of the circuit. Oxygenation was assessed by pulse oximeter. Saturation was maintained more than 96% in all the patients. None of the patients had hypoxia as defined as saturation less than 94% on 50% oxygen and Nitrous oxide. There were no episodes of aspiration or other complications associated with LMA. There were no failed insertions. Postoperative oxygen saturations were well maintained in all the 35 patients.

| S. No. | Demographic Data | |
|---|---|---|
| 1 | Total no. of cases | 35 |
| 2 | Mean age in years | 27.4 |
| 3 | Mean BMI | 28.4 |
| 5 | Gestational age (no. of patients) | |
| | Second trimester | 26 |
| | Third trimester | 03 |
| | 3rd stage of labour for manual removal of placenta | 06 |
| 6 | Indication for LMA (no. of patients) | |
| | Cervical circlage | 21 |
| | Bartholin's abscess | 05 |
| | Manual removal of placeta | 06 |
| | Suction evacuation of Vesicular Mole | 03 |

Table 1: Demographic Data & Etiological factors

| S. No. | Parameter | |
|---|---|---|
| 1 | Total no of cases | 35 |
| 2 | First time Insertion | 31 |
| 3 | Insertion in second attempt | 04 |
| 4 | Needing > 2 attempts | 0 |
| 5 | Trauma during insertion | 0 |
| 6 | Failed insertion | 0 |

| | | |
|---|---|---|
| 7 | Failed oxygenation & ventilation | 0 |
| 8 | Aspiration during anesthesia | 0 |
| 9 | Other complications | 0 |
| 10 | Total duration of anesthesia in minutes (mean) | 19 |
| 11 | Postoperative complications | 0 |

Table 2: Procedural Events

**DISCUSSION:** From the difficult airway algorithm as an emergency airway tool, LMA has paved the way into the elective obstetric procedures.[4] LMA may be used as an alternative to face mask in certain procedures like cervical circlage, manual removal of retained placenta and for certain non-obstetric procedures in obstetric patients requiring sedation (abscess drainage, wart excision etc).

Aspiration is the second leading cause of anesthesia- related maternal mortality. Silent regurgitation can occur in 8% to 15% of people.[5] The laryngeal mask airway (LMA) has been used extensively to provide a safe airway in spontaneously breathing patients who are not at risk from aspiration of gastric contents.[6, 7] The routine elective use of LMA in obstetric surgeries was not advocated due to the associated problems like

1. Increased risk of Aspiration of gastric contents
2. Requirement of multiple attempts in 0.4 to 0.6% of patients due to:
    a. Impaction of epiglottis within the lumen.
    b. LMA can get folded on itself, resulting in Gaseous distention of stomach due to improper sealing of glottis opening.
    c. Occlusion of glottis by the distal cuff.
    d. 90-180º rotation of the mask around long axis.
3. Risk of early hypoxia with risk to two lives.
4. Positive pressure ventilation may not be as optimal as with a ETT.

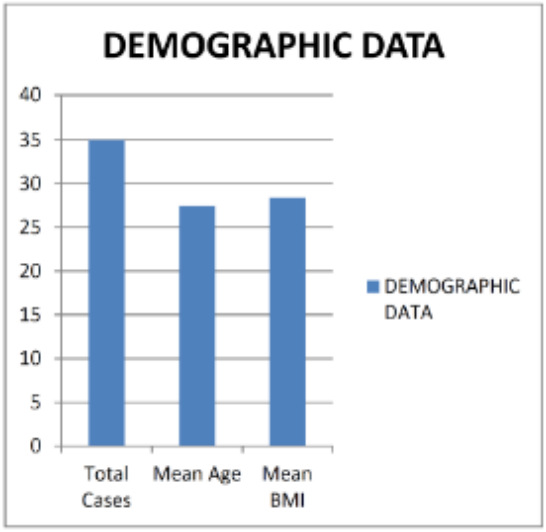
**Cricoid Pressure and LMA:** Cricoid pressure, first described by Sellick in 1961, has become standard practice to prevent regurgitation and aspiration in obstetric patients. The danger of gastric aspiration may necessitate application of cricoid pressure during induction of General Anesthesia. Studies suggest that cricoid pressure before insertion of classic LMA significantly decreased tidal volume during IPPV.[8] The location of the distal end of the LMA may have a wide variation of as high as C4 or as low as T1. Cricoid pressure, which is applied at C6 level may prevent the proper insertion of LMA, may cause wedging of LMA in the hypopharynx, and may lead to tilting of laryngeal aperture by 40° anterior with the inflation of cuff. All these factors may cause difficult ventilation and more difficulty for blind insertion of an intubating device. The momentary release of cricoid pressure, as the LMA tip reaches the hypopharynx maximizes the chances of correct placement of LMA and may be considered in cases of maternal desaturation. The cricoid pressure applied after LMA insertion may decrease the ability to blindly intubate through LMA from 90% to 56%.[9] We used cricoids pressure at the beginning of induction and released the pressure only after inflation of the LMA cuff and confirming bilateral air entry.

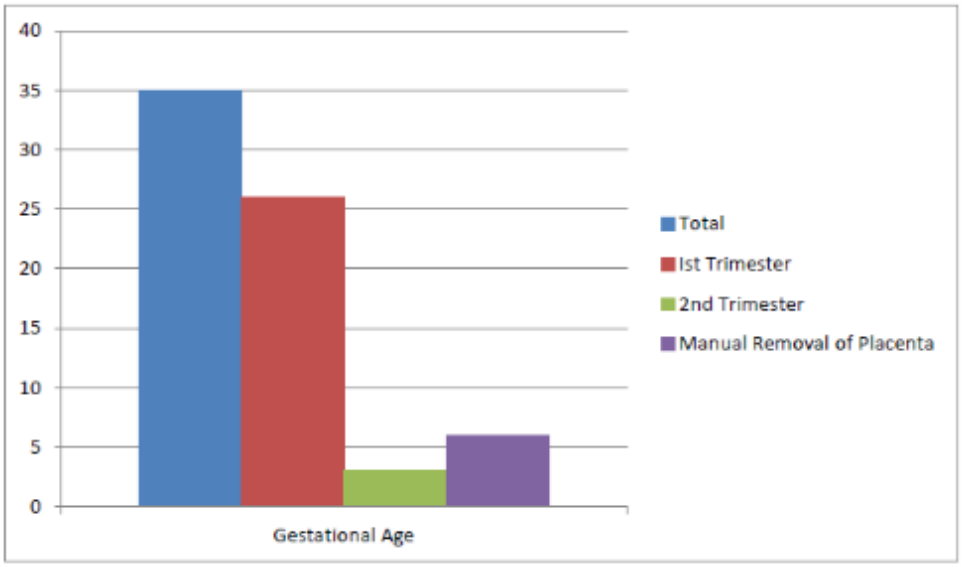
The risk of aspiration with LMA can be reduced with the antiemetic prophylaxis like a combination of $H_2$ receptor antagonist, proton pump inhibitors and non-particulate sodium citrate. The risk of aspiration is less with spontaneous ventilation and with the use of ProSeal LMA in the parturients.[10, 11] It was demonstrated on cadaveric models that the PLMA with a closed drainage tube, attenuate liquid flow between the oesophagus and pharynx.[12] In our present study, we ensured that all the patients had a NBM status of 6hours for solids. All the patients were given anti emetic prophylaxis with Ranitidine and Metaclopramide.

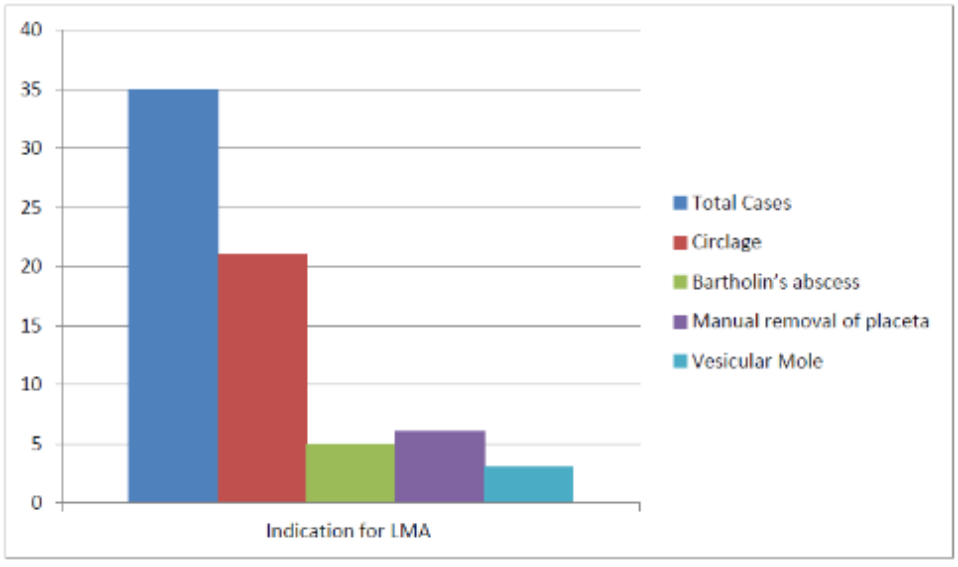
**Proseal (PLMA) and Intubating LMA (ILMA) in Obstetrics:** PLMA/ ILMA is considered safer in the obstetric population as compared to classic LMA .A clear advantage of the Intubating LMA compared with the ProSeal™ LMA is that, it is more easier to insert and is suitable as an airway intubator.[13,14] ILMA allows effective ventilation and also functions as a conduit for the blind passage of an ETT. The ETT will facilitate long-term ventilation if necessary and provides protection to the airway from regurgitation and subsequent aspiration. However, the disadvantage is that ILMA exerts higher pressures against the pharyngeal mucosa than ProSeal™ LMA. ProSeal™ LMA was associated with less mucosal damage when used in the obstetric subpopulation, but the first time insertion rates are higher with ILMA. Our first time insertion rate was 87.2% and the failure rate of insertion was nil.

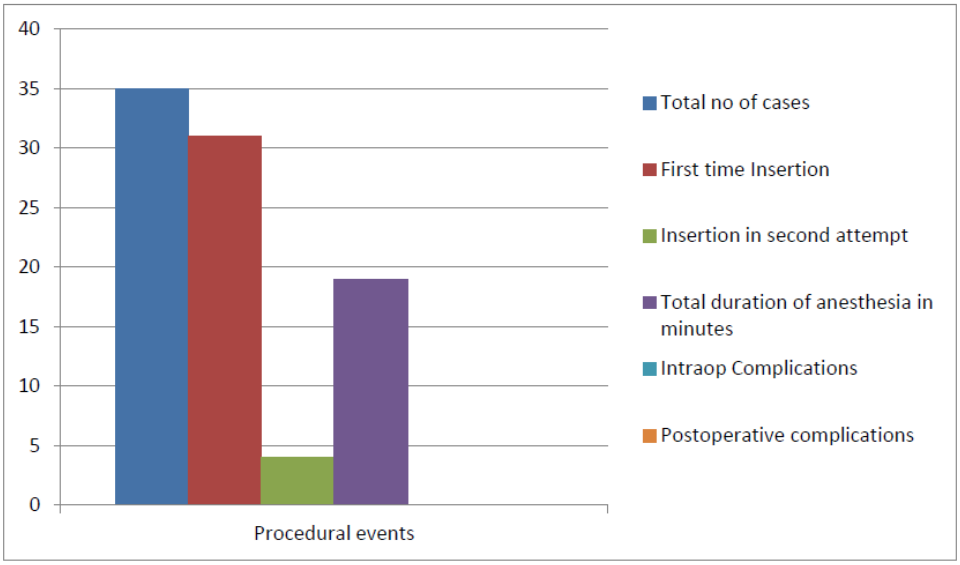
**LMA for caesarean section:** Regional anesthesia still remains the technique of choice in Obstetric subpopulation. The definitive management of airway always is by securing it with ET tube. Nevertheless LMA has been used in elective caesarean sections conducted by general anesthesia. Han et al studied the use of the laryngeal mask airway (LMA) for elective Cesarean section and concluded that the LMA is effective and probably safe for elective Cesarean section in healthy, selected patients.[14] Ivascu Brown et al described the use of ProSeal laryngeal mask airway (PLMA) and controlled ventilation for eight sessions of electroconvulsive therapy in a pregnant patient in 2$^{nd}$ trimester of pregnancy.[15]

**CONCLUSION:** We conclude that the LMA is effective and safe for in carefully selected ASA 1 pregnant patients in the hands of experienced Anesthesiologist. The soft and rounded edge of LMA gives better compliance to a spontaneously breathing patient and at the same time prevents the injury to the soft tissues. The ease of insertion, the first time success rates are more with ILMA. However aspiration when occurs, is associated with increased morbidity and maternal mortality. Hence, a cautious approach to the patient, proper precautions against aspiration and proper selection of the patients are important to prevent any adverse outcomes.


DEMOGRAPHIC DATA
40
35
30
25
20
15
10
5
0
Total Cases
Mean Age
Mean BMI
DEMOGRAPHIC DATA


40
35
30
25
20
15
10
5
0
Gestational Age
Total
Ist Trimester
2nd Trimester
Manual Removal of Placenta


40
35
30
25
20
15
10
5
0
Indication for LMA
Total Cases
Circlage
Bartholin's abscess
Manual removal of placeta
Vesicular Mole

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