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A prospective observational study of I-gel supraglottic airway in short gynaecological laparoscopic surgeries

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Abstract

Background: Increase use of laryngeal masks like I-gel in recent years is growing because of its single use, non-inflatable and other advantages.

Methods: This prospective observational study was conducted in female patients who came for laparoscopic surgeries in IVF unit of a tertiary care teaching institute during study period of 6 months in whom I-gel supraglottic airway device was used. Age, weight, type of surgery, I-gel size, number of insertion attempts ease of insertion, oropharyngeal leak pressure were recored. Any complications occurring during insertion and adverse events in post-operative period were noted.

Results: A total of sixty women were included with in a study period of six month. Mean age of the patients were 30.55 years. Duration of anaesthesia ranged from 25 to 50 min. Most of the surgeries (60%) were performed as diagnostic laparoscopy. The overall insertion success rate was 96.67%. Size 3 was used comfortably in every case and it was judged as easy in every case. Mean insertion time of I-gel was 6.5 seconds (range 4-8 seconds). Oropharyngeal leak pressure was 26 cm of water (range 23-40). No complication or adverse event was noted during peri and post-operative period.

Conclusion: I-gel is a simple, reliable, fast, effective and easy to use supraglottic airway device with high leak pressure and without significant complications in patients requiring shorter duration surgery like gynaecological laparoscopic surgeries.

Keywords: Laryngeal masks, Supraglottic airway device, I-gel, Laparoscopy, Oropharyngeal leak pressure

Introduction

Various airway devices have been used during general anaesthesia for various surgical procedures. Increased heart rate, arrhythmia, and other cardiovascular side effects in patients by the use of endotracheal tube; leads to increase use of laryngeal masks in recent years. They include I-gel, the laryngeal mask supreme (LMA-Supreme), and other types of laryngeal masks.[1,2] These supraglottic airway device (SAD) have low airway morbidity along with sufficient airway pressure in the trendelenburg position and ease of placement; so they have been determined as an alternative to endotracheal tube.[3,4] The I-gel is a second generation single use supraglottic airway device, made of a medical grade thermoplastic elastomer, designed to create a non-inflatable anatomical seal of the pharyngeal, laryngeal and perilaryngeal structures. An integrated gastric channel provides an early warning of regurgitation, facilitates venting of gas from the stomach and allows for the passing of a suction tube to empty the stomach contents.[5-7]

These types of SAD are commonly preferred in short operative procedures and gynaecological laparoscopic procedure are of 30-60 min duration and very few studies related to I-gel use were conducted in India. So, this study was planned to evaluated I-gel supraglottic airway in short gynaecological laparoscopic surgeries.

Materials & Methods

This prospective observational study was conducted in a tertiary care teaching institute of Rajasthan after taking approval from Institutional Ethics Committee. All the female patients who came for laparoscopic surgeries in IVF unit during study period of 6 months were included in the study in whom I-gel supraglottic airway device was used. Informed consent was taken from all the patients. Patients with known lung disorders, difficult airway, pregnancy, obesity, risk factors for difficult intubation or regurgitation and those who required surgery in positions other than supine or lithotomy position were excluded. Prenaesthetic check-up was done in detail by the anaesthesiologist, a day prior to operation. Propofol (2-2.5mg/kg i.v) was used for induction of anaesthesia. Anaesthesia was maintained on O_2, Sevoflurane (2%) and inj Atracurium. The insertion of I-gel was done according to manufacturer's instruction. SAD was removed when the patient started spontaneous respiration. All patients had continuous pulse oximeter, ECG and blood pressure monitoring.

Data recorded were as follows; age, weight, type of surgery, I-gel size; number of insertion attempts; ease of insertion; Oropharyngeal leak pressure. Complications occurring during insertion, maintenance, and removal were also noted for each patient. Laryngospasm, desaturation (SpO2 < 95%), aspiration (fluid in the ventilation tube), bronchospasm, and blood contamination on the SAD upon removal were

recorded. Sore throat, coughing, dysphagia, and dysphonia were evaluated in the recovery room.

SAD placement was classified according to difficulty using a five-point scale (1 = easy, 2 = not so easy, 3 = difficulty, 4 = very difficult, and 5 = impossible).[8]

All the data was recorded in mean or percentage.

Results

A total of sixty women were included in this study with in a study period of six month. Mean age of the patients were 30.55 years. Duration of anesthesia ranged from 25 to 50 min. [Table 1] Most of the surgeries (60%) were performed as diagnostic laparoscopy followed by laparoscopic myomectomy (20%) and laparoscopic recanalization (11.67%). [Table 2] The overall insertion success rate was 96.67%. The first attempt at insertion was successful in 93.33%. Two patients needed 2nd attempt while none needed 3rd attempt. Only two failures occurred who were successfully intubated. Failures were due to a large pharyngeal leak. Size 3 was used comfortably in every case of our study and it was judged as easy in every case. Mean insertion time of I-gel was 6.5 seconds (range 4-8 seconds). Oropharyngeal leak pressure was 26 cm of water (range 23-40). Gastric tube placement was not required by any patients. There was no clinical evidence of aspiration in any patient. No significant adverse event was noted during perioperative period in any patient. No blood staining was noted after removal of the device and it was found easy removal in all the cases. None of the patient complained of dysphonia or dysphagia or cough or sore throat in the postoperative period. [Table 3]

Table 1: Patient's characteristics

Age (yrs)	30.55 (range 22 – 48)
Weight (kg)	58.5 (range 45-65)
ASA Physical status I//II/III	60/0/0
Mallampati class 1, 2	52/08
Durationof Anaesthesia (min)	34 (range 25-50)

Table 2: Types of surgeries

Type of Surgery	Number (%) N=60
Laproscopic Hysterectomy	03 (5%)
Laproscopic Cystectomy	02 (3.33%)
Laproscopic Recanalization	07 (11.67%)
Laproscopic Myomectomy	12 (20%)
Diagnostic Laproscopy (Tube cannulation, Lateral septoplasty, Ovarian drilling etc.)	36 (60%)

Table 3: Airway insertion details, oropharangeal leak pressure, complications

Size of I-gel 3/4/5 (n)	60/0/0
Insertion attempts 1/2/3/Failed (n)	56/2/0/2
Time for Insertion (sec)	6.5 (range 4-8)
Ease of Placement 1/2/3/4/5 (1.easy, 2. not so easy, 3. difficult, 4. very difficult, 5. Impossible)	60/0/0/0/0
Easy removal (n)	60
Oropharyngeal leak pressure (cm of H_2O)	26 (range 23-40)
Complications/ Adverse events	00

Discussion

Now a days the laryngeal masks have been widely used by anesthesiologists in short period surgical operations due to its less side effects and other advantages.[9-12] Use of I-gel is also increasing in short laparoscopic surgical operations because of its single use and other advantages.[5]

In this study mean age of the patients was 30.55 years which is closely related to the age group, where women want to conceive. Now a days infertility is also increasing in this age group and results of our study also showed that most of the patients came for diagnostic laparoscopy purpose as this study was conducted in IVF unit of tertiary care teaching institute. Duration of anaesthesia or surgery was also found less as compared to other studies. One study has reported higher (67 min) mean time as compared to our study which could be due to inclusion of laparoscopic surgeries from all the surgical departments of hospital.[13] Another study done only in gynaecological surgeries have also reported mean time 66 min.[14] This large difference from our study could be because of experienced and skilled surgeon in their field in our set-up.

Overall success rate of I-gel was 96.7% which is similar to reported by other studies. Insertion time was also found 6.5 sec. Shorter insertion time could be because of the non-inflatable cuff of the I-gel. Similar results were also found in other studies where they compared I-gel with other laryngeal mask airways. I-gel is also easy to insert because of its shape, contours, firm stem, bite guard, and buccal stabilizer.[14,15]

In our study oropharngeal leak pressure was found above 23 cm H_2O in all the cases. Other studies have also reported similar results of high leak pressure with I-gel use.[8,16] High leak pressure of airway devices enables the safe ventilation at high airway pressures which occurs in laparoscopic surgery.[14] In our study all surgeries or procedures were done in supine position because in lithotomy or trendelenburg position diaphragm will be placed high which leads to reduced lung vital capacity and increased chances of regurgitation. I gel should also be avoided in patients of

pre-operative sore throat, history of regurgitation, heart burn, respiratory and cardiac diseases, and patients requiring urgent surgery, oral and nasal surgery. If patient's BMI is also more than 35; then also its use can lead to poor fitting of i-gel which can cause leak, increased chances of regurgitation and reduced vital capacity.

In our study there was no blood contamination after removal of I-gel and also there was no post-operative complication. Similar findings had been reported by other studies.[16,17] The reason of this could be non-inflatable cuff of I-gel shape; which leads to easier insertion and less tissue compression of adjacent structures.[18-20]

Conclusion

We concluded that I-gel is a simple, reliable, fast, effective and easy to use supraglottic airway device with high leak pressure and without significant complications in patients requiring shorter duration surgery like gynaecological laparoscopic surgeries.

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