A Comparative Study of the Air-Q Self Pressurized Airway Device with Blocker Versus the Proseal Laryngeal Mask Airway in Diagnostic Laparoscopy

Original Article

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ABSTRACT

Background: ProSeal Laryngeal Mask Airway (PLMA) is a well-established device used for airway management, while the Self-Pressurized Air-Q with Blocker (SP-Blocker) is a newer supraglottic airway device.

Objectives: Researchers compared SP-Blocker with PLMA under general anesthesia (GA).

Patients and Methods: 100ASAI&II women undergoing diagnostic gynecological laparoscopy in Trendelenburg position under GA were randomly assigned to 2 groups. Cases were divided equally into SP-Blocker and PLMA groups. Primary outcome was oropharyngeal leak pressure (OLP). Secondary outcomes were peak airway pressure, plateau airway pressure, inspiratory tidal volume (ITV), expiratory tidal volume (ETV), leak volume (LV), leak fraction (LF), dynamic lung compliance (C_{dyn})., and airway resistance(R_{aw}). Primary and secondary outcomes were measured in T1 (10min.post-device insertion while patient in neutral position) and T2 (15min. post-pneumoperitonium with CO_2).

Results: At T1: SP-Blocker revealed elevated mean OLP (cmH_2O) (33.41±2.38 vs. 30.64±2.12 respectively; 95% CI -3.67 to -1.88, p<0.0001), increased mean ITV (ml) (571.2±66.7 vs.514.6±63.5 respectively; 95% CI -82.45 to -30.75, p=0.041), increased mean ETV (ml) (546.5±61.3 vs. 470.7±78.7 respectively; 95% CI -103.8 to -47.8, p<0.0001), lower mean LV & LF, and better C_{dyn}.(ml/cmH_2O) (p=0.031) than PLMA. At T2: SP-Blocker and PLMA continued in the same manner as at T1. Mean insertion time (sec) was decreased in SP-Blocker group compared to PLMA group (18.21±3.8 vs. 20.36±4.33 respectively; 95% CI 0.53 to 3.77, p=0.0097). There were no significant differences between the studied groups in terms of ease of insertion, number of attempts, airway resistance, postoperative laryngopharyngeal morbidity or hemodynamic parameters at various time points.

Conclusions: SP-Blocker became equally effective alternative to PLMA.

Key Words: Laryngopharyngeal morbidity, leak fraction, oropharyngeal leak pressure, supraglottic airway devices.

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INTRODUCTION

Recently, supraglottic airway devices (SAD) are used in clinical practice providing a simple, effective and successful alternate to endotracheal intubation in cases subjected to laparoscopic approaches with elevated peak airway pressure (PAP) under general anesthesia due to its potential advantages including stable hemodynamics and reduced airway morbidity[1,2].

ProSeal laryngeal mask airway (PLMA) shown in (Figure 1A) is a second-generation reusable silicon-made SAD with a modified cuff, and a drainage channel that provides a bypass channel that aimed at preventing gastric insufflation and enabling the passage of a gastric tube improving its safety. Its airway tube has a bite block. Size of PLMA was selected according to patient weight (size3: 30-50 Kg, size4: 50-70 Kg, size5: 70-100 Kg) and cuff inflation is done using a sufficient amount of air to produce a cuff pressure of 60 cm H_2O by a handheld cuff manometer[3].

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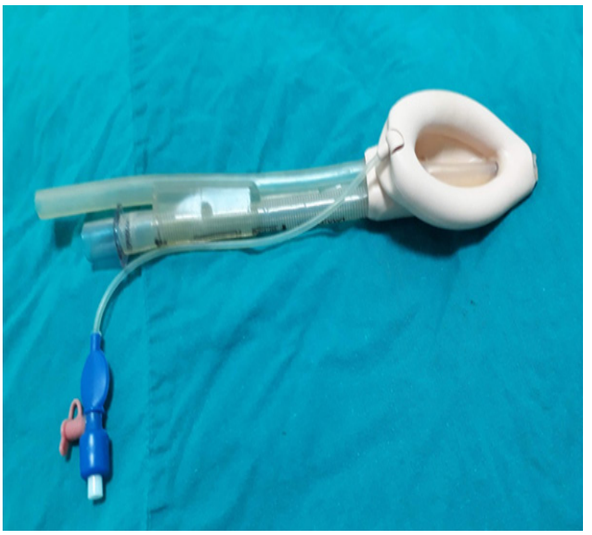

Fig. (1A): Proseal Laryngeal Mask Airway (PLMA).

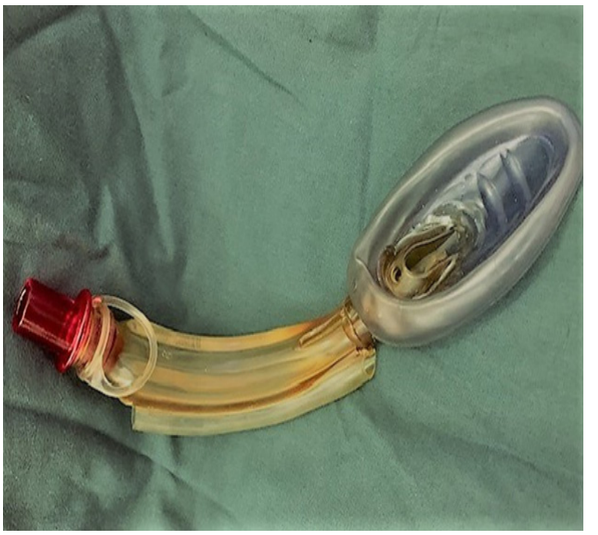

Fig. (1B): Air Q Self Pressurized Airway Device with Blocker(SP-Blocker).

Air Q Self Pressurized Airway Device with Blocker® tube in place (SP-Blocker) shown in (Figure1B) is a new self-pressurizing disposable PVC made SAD. It acts as standard Air Q due to retaining a soft perimeter mask cuff increasing its capacity to change cuff size and shape depending on the pharyngeal anatomy of the patient. SP Blocker contains a large opening between its cuff and breathing tube to produce an automatic cuff with adequate self-pressurize to an appropriate inflation pressure with cyclical lowering intra-cuff pressure to diminish mucosal and nerve trauma. It incorporated an integrated bite block and a novel isolated built-in soft flexible guide tube that accepts a gastric tube, suction tube, or blocker tube which is a big bore draining tube containing many apertures that's designed to pass through the guide channel to access and aspirate posterior pharyngeal area along with aspirate, vent and block the upper esophageal portion. Choosing the SP-Blocker size depends upon the weight of the patient (size 2.5:30-50Kg, size 3.5:50-70Kg, size4.5:70-100Kg)[4-6].

Primary outcome was oropharyngeal leak pressure (OLP), while secondary outcomes included PAP, plateau airway pressure, inspiratory& expiratory tidal volumes (ITV& ETV), leak volume & fraction(LV & LF), airway resistance(R_{aw}.), and dynamic lung compliance(C_{dyn}.). Outcomes were measured in T1 (10min.post-device insertion while patient in neutral position) and T2 (15min. post-pneumoperitonium with CO_2).

PATIENTS AND METHODS

Comparative prospective randomized clinical trial was performed at Obstetrics and Gynecology Department of Cairo University Hospitals. Ethical approval was attained in 2017(Ethical Committee N-95-2017), thereafter it was updated in 2024(Ethical Committee N-188-2024) by Research Ethical Committee of Cairo University Hospitals. The study was registered with https://clinicaltrials.gov/study/NCT03384056; before patient enrolment. Informed written consent was taken from all cases before enrolment. Cases were recruited based upon Consort Flow Chart Diagram as presented in (Figure 2).

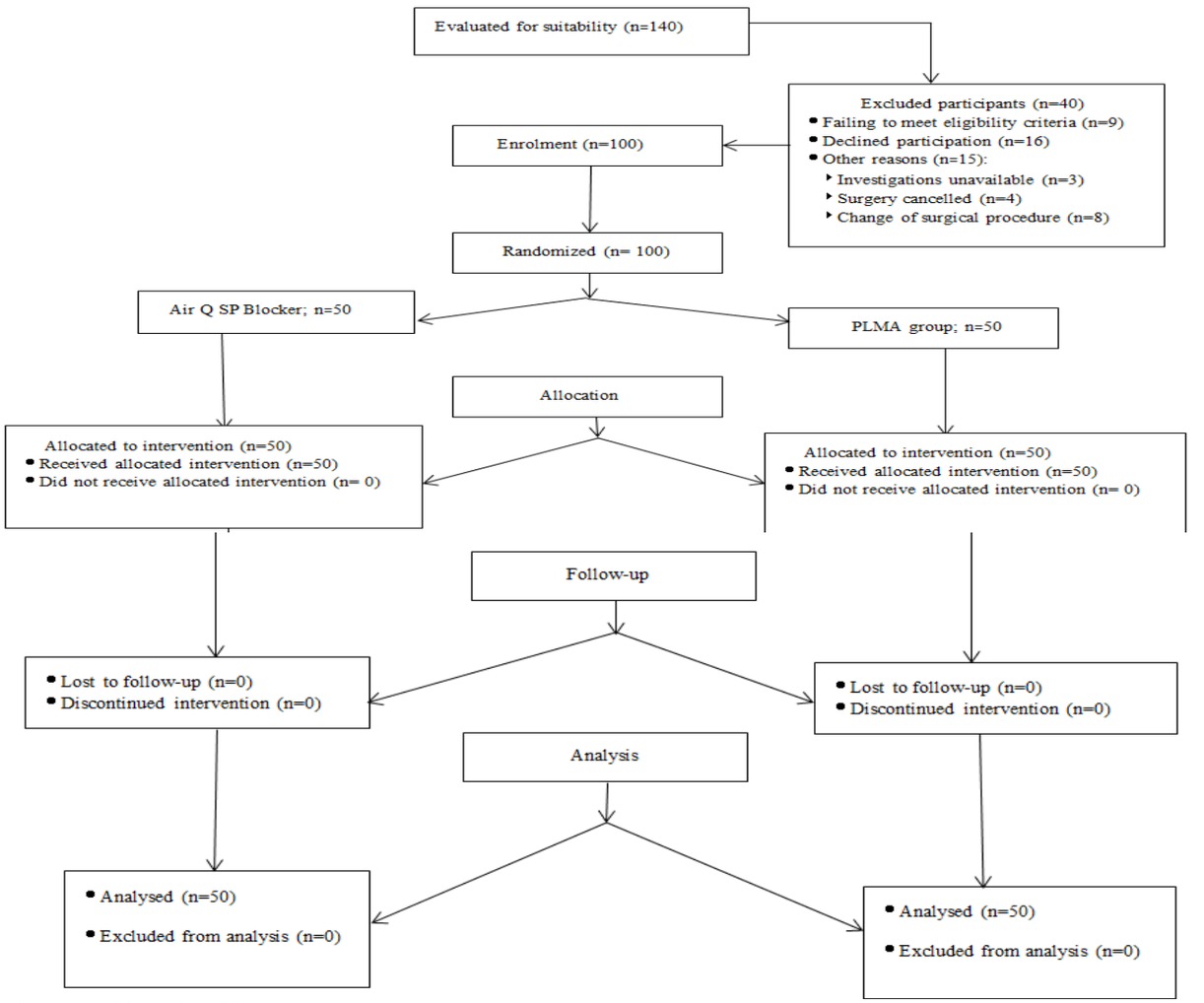

Fig. 2: Consort Flow Chart Diagram.

Demographic Data: ASAI&II female patients with planned diagnostic gynecological laparoscopies were collected for inclusion. Exclusion criteria were BMI ≥35Kg/m2, cases with El-Ganzouri score of 5 or more, presence of airway disorders, presence of hiatus hernia, pregnancy and obstructive sleep apnea.

Randomization: eligible subjects were consecutively enrolled and randomly classified into SP-Blocker group or PLMA group through the online randomization program (http://www.randomizer.org) with an allocation ratio of 1:1. Masking was confirmed through the usage of sequentially numbered sealed & opaque envelops.

Anesthesia plan:

The patient was positioned supine with head in a neutral position and conventional monitoring was established prior induction of anesthesia (pulse oximetry, ECG and non-invasive BP). Preoxygenation was done using high flow O_2 for 3min before induction of GA using IV fentanyl 1ug/kg and propofol 2mg/kg. Following ensuring lost consciousness, IV atracurium 0.3mg/kg was received. Continuous mask ventilation was applied with 3-4% sevoflurane for three minutes. After attaining muscle relaxation (TOF=0), lubrication of the equipment used was carried out using water-soluble jelly to facilitate insertion in patient 's mouth by senior anesthetists who did successful 40 SP Blocker insertion along with prior 200 PLMA insertion.

PLMA group: insertion of size 4 (with its cuff deflated) was done in sniffing position and subsequently cuff inflation was performed with adequately enough air to acquire cuff pressure of 60cmH_2O that was kept by regular checking of the cuff every 20min till termination of the operation through the deflation of excess air from the cuff using a syringe. Preloading of PLMA was done using 16 Fr. gastric tube.

SP Blocker group: size of 3.5 was chosen to be inserted while neck extended followed by opening the patient mouth, then the tongue was elevated by a tongue blade to elevate the epiglottis off posterior pharyngeal wall so as to

help its smooth advancement through pharynx till the fixed resistance to forward progression was felt. Either blocker tube or nasogastric tube was negotiated in the esophagus following optimum positioning of SP-Blocker.

Two attempts were permitted per patient. Size selection of SAD used for first attempt based on patient weight. When ventilation became insufficient (i.e. inappropriate capnographic curve and/or provision of deficient TV; incremental loss of greater than twenty percent of set TV), manipulation was allowed & categorized as minor intervention (that include adjusting the position of the head& neck, changing insertion depth either by pushing or pulling of the SAD, chin lift& jaw thrust) or major interventions (SAD reinsertion or change the size).

Optimal ventilation was determined as a square wave capnograph trace with plateau and proportional chest movement bilaterally on manual ventilation during gentle squeeze of reservoir bag without hearing gas leak. Failed attempt refers to the removal of the equipment before the re-insertion. If insertion of SAD couldn't be done by the 2nd attempt, tracheal intubation was carried out and this patient was ruled out from study. Following confirmed SADs successful placement, volume-controlled mechanical ventilation was applied with a TV of 10ml/kg of total BW, ventilation rate of 12 b./minute to keep $ETCO_2$ between 30-40 mmHg, I:E ratio:1:2 and a gas flow rate of 4L/min. At the end of operation, pyridostigmine 0.2 mg/kg in addition to glycopyrrolate 0.008 mg/kg was administered for reversing the impacts of atracurium, then removal of SAD &its drain tube was done following ensuring proper spontaneous respiration.

Placing of the patients in Trendelenburg position was achieved after creating a pneumoperitoneum by CO_2 insufflation and insertion of the laparoscopic ports was done. The Trendelenburg position was kept at 30º. In the two groups, 10 minutes following the SAD insertion (T1) and 15 minutes after CO_2 pneumoperitoneum (T2), the changes to oropharyngeal leak pressure (OLP), PAP, plateau airway pressure, compliance, R_{aw}, ITV, ETV, LV&LF were measured by the spirometer. In both groups, induction of CO_2 pneumoperitoneum was done using a maximum intra-abdominal pressure of 15 mmHg.

Study outcomes: primary and secondary outcomes were measured at T1 and T2.

Primary Outcome: OLP (cmH_2O)

OLP means the achieved plateau pressure at which leak sound is heard around mouth on complete closure of the valve used to adjust the pressure using a fresh gas flow at 3l. /minutes while patient was apneic. To confirm safety, maximum allowed OLP was maintained at 40 cmH_2O[7-9].

Secondary Outcomes:

1. PAP (cmH_2O).
2. Plateau airway pressure (cmH_2O).
3. C_{dyn} (ml/cmH_2O).
4. R_{aw} ($cmH_2O/L/s$).
5. Respiratory parameters: ITV, ETV & LV in ml, and LF in % were recorded. LV=ITV-ETV. LF (%) = LV/ITV X100[10,11]. Airway sealing quality score was employed to evaluate the degree of leak as recorded in (Table 1)[12].

Table 1: Airway sealing quality score[12].

1	no leak detected
2	minor leak of inspired tidal volume(V_t loss < 20%)
3	moderate leak of inspired tidal volume(V_t loss 20%-40%)
4	insufficient seal(V_t loss > 40%)

Insertion Variables:

1. Insertion time (sec): time required to correct SAD placement & initiated when SAD touched teeth to 1st recorded rectangular capnogram curve with satisfactory chest expansion on both sides. Only successful trials were counted[9].
2. Ease of SAD insertion: insertion score is a 4-point scoring system (3 means the insertion was achieved at 1st attempt without any resistance felt, 2 means the insertion was achieved at 1st attempt with resistance felt, 1 means the insertion was achieved at 2nd attempt, 0 means the insertion failed at 2nd attempt)[12-14].
3. Insertion time and the number of insertion attempts of drain tubes (nasogastric tube in PLMA& blocker tube or nasogastric tube in SP-Blocker) were recorded and success of its placement assessed via 3 point scale (1=easy placement, 2=difficult placement and 3=impossible placement). Failure means that we couldn't advance drain tubes into stomach after 2 attempts[15].

Perioperative Variables:

1. Hemodynamic parameters after initial placement of devices.
2. Laryngopharyngeal morbidity (LPM) parameters at one and four hours after the operation as documented in (Table 2)[16].

Table 2: LPM Score: Laryngopharyngeal morbidity parameter with scores[18,20].

Scores	0	1	2	3
sore throat	none	minimal	moderate	severe; SAD never to be used again
dysphagia	none	minimal	moderate	severe; patient cannot eat
hoarseness	none	minimal	moderate	severe; up to aphonia and patient cannot speak

Statistical Analysis:

Sample size was estimated according to the information obtained from a pilot study of thirty cases in PLMA and SP Blocker groups (15 cases/ each), in which OLP was evaluated as 26.1 ± 4.3 cmH_2O and 29.3 ± 6.1 cmH_2O, respectively. Sample size was calculated according to the above-mentioned data at a two-tailed $\alpha = 0.05$ and eighty percent power, detected that 44 cases were necessary to determine statistically significant difference between the groups. 50 subjects per each group were recruited for potential dropouts. We used a random number list from the computer, in order to perform random allocation of the participants to PLMA group ($n = 50$) or SP Blocker group ($n = 50$).

Data presented as mean ± SD or number of cases (%) were documented via the use of a data collection sheet and analysis was done by SPSS version 18 software (IBM Corp., USA).Subject characteristics were compared between the two groups. Continuous normally distributed variables (data expressed as mean and SD) were analyzed by Student's t-test for comparing the means of both groups, while F-test was used for comparing their standard deviations (SD). Analysis of categorical variables was done via chi-squared or fisher's exact test. *p- value* of < 0.05 was statistically significant.

RESULTS

140 individuals had been assigned at random and forty patients were excluded. (Figure 2) showed that 100 individuals were included and grouped equally permitting 50 cases in each group. No statistically substantial variations were recorded as regards the demographic data of the compared groups as shown in (Table 3).

Table 3: Demographic data of the studied groups.

parameter	SP Blocker (*n*=50)	PLMA (*n*-50)	*p value*
age (years)	27.4±8.6	28.1±7.9	0.67
weight (kg)	63.2±7.8	65.6±9.9	0.1
height (cm)	160.9±8.0	163.7±8.0	0.08
BMI (kg/m^2)	24.68±3.17	24.69±3.5	0.9
ASAI/II	38/12	37/13	0.32
duration of anesthesia (min.)	48.1 ± 16.2	49.2 ± 11.8	0.69
duration of pneumoperitonium (min.)	25.7 ± 14.4	21.4 ± 11.3	0.09

Continuous normal-variables are presented as mean ±SD (means compared by using Student's t test, and SD compared by using F test). $p>0.05$: statistically insignificant. $p<0.05$: statistically significant.

No significant statistical variations were observed regarding LPM score at one hr. & four hr. postoperatively in both groups as shown in (Table 4).

Table 4: Comparison between SP Blocker and PLMA regarding laryngopharyngeal morbidity parameters(LPM).

parameter	SP Blocker(*n*=50)	PLMA(*n*=50)	*p value*
LPM parameters at 1hour postop: (№) (%):			
sore throat	1(2%)	3(6%)	0.31
dysphagia	2(4%)	5(10%)	0.24
hoarseness	0	0	N/A
LPM parameters at 4hour postop: (№) (%):			
sore throat	0	0	
dysphagia	0	0	N/A
hoarseness	0	0	

categorical data are presented as numbers and percentage using Chi squared test. $p>0.05$: statistically insignificant. $p<0.05$: statistically significant.

No differences in the insertion variables of both groups with exception of significant shorter insertion time of SP Blocker in comparison with PLMA as presented in (Table 5).

Table 5: Comparison between Air-Q SP Blocker and PLMA regarding the insertion parameters.

Parameter	SP Blocker (*n*=50)	PLMA (*n*=50)	*p value*
Insertion time (seconds)	18.21±3.8	20.36±4.33	0.0097*
SAD insertion attempts: (№) (%)			
1st	50 (100%)	50 (100%)	N/A
2nd	0	0	
Ease of SAD insertion score: (№) (%)			
3	43(86%)	39(78%)	0.3
2	5(9%)	8(16%)	
1	2(5%)	3(6%)	
Manipulations of SAD placement: (№) (%)			
No	46(91%)	48(95%)	0.4
Yes	4(9%)	2(5%)	
Maneuvers of SAD placement: (№) (%)			
1 maneuver	4(9%)	2(5%)	0.4
2 maneuvers	0	0	N/A
Time to insert drain tube (seconds)	7.11±2.3	7.4±2.36	0.54
Attempts of drain tube insertion: (№) (%)			
1st.	43(86%)	45(89%)	0.65
2nd.	7 (14%)	5(11%)	
Ease of drain tube insertion score: (№) (%)			
1: easy	46(92%)	47(93%)	
2: difficult	4(8%)	3(7%)	0.85
3: impossible	0	0	N/A
Gasrtic insufflation(№):			
No	50	50	N/A
Yes	0	0	

continuous normal-variables are presented as mean ±SD(means compared by using Student's t test, and SD compared by using F test). categorical data are presented as numbers using Chi squared test. $p>0.05$: statistically insignificant. $p<0.05$: statistically significant. SAD: Supra-Glottic Airway Device.

No significant detectable changes in hemodynamic measurements at different time points between the devices as recorded in Figures (3-6).

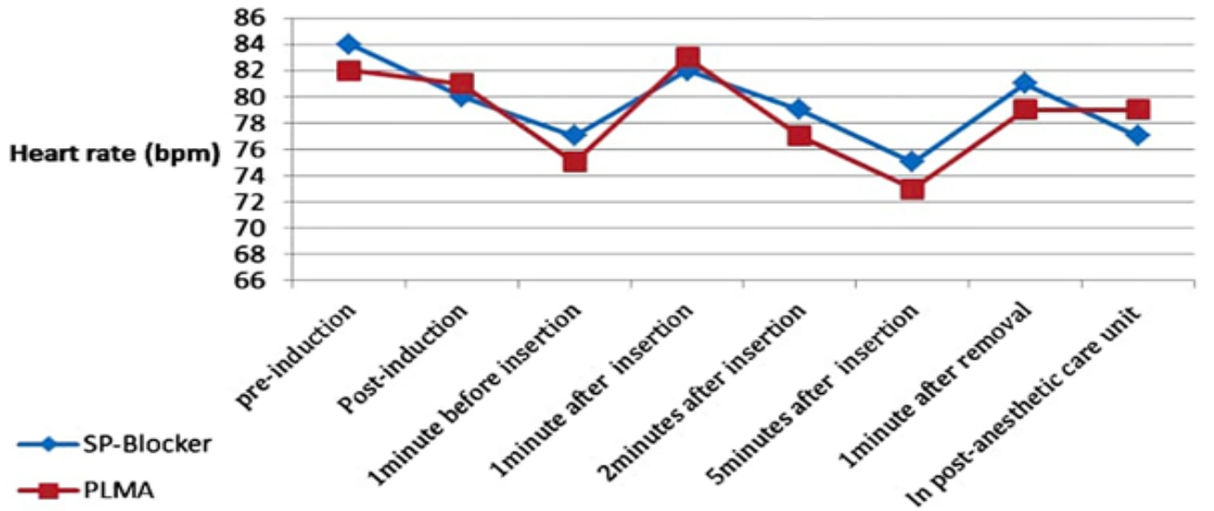

Fig. 3: Comparison between Air Q SP Blocker group and PLMA group with respect to the changes in the heart rate(HR)(bpm).

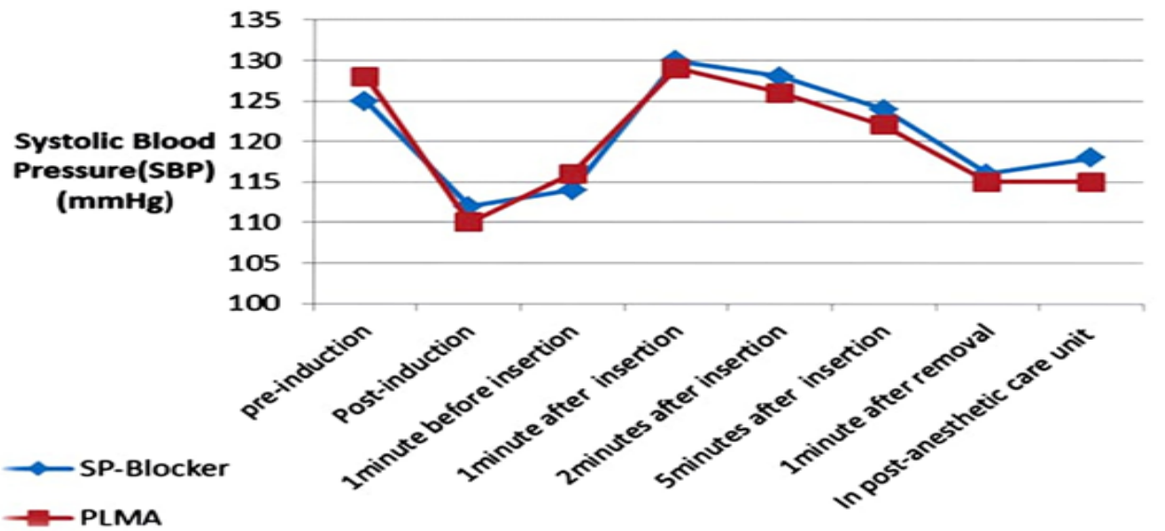

Fig. 4: Comparison between Air Q SP Blocker group and PLMA group concerning the changes in the systolic blood pressure(SBP)(mmHg)

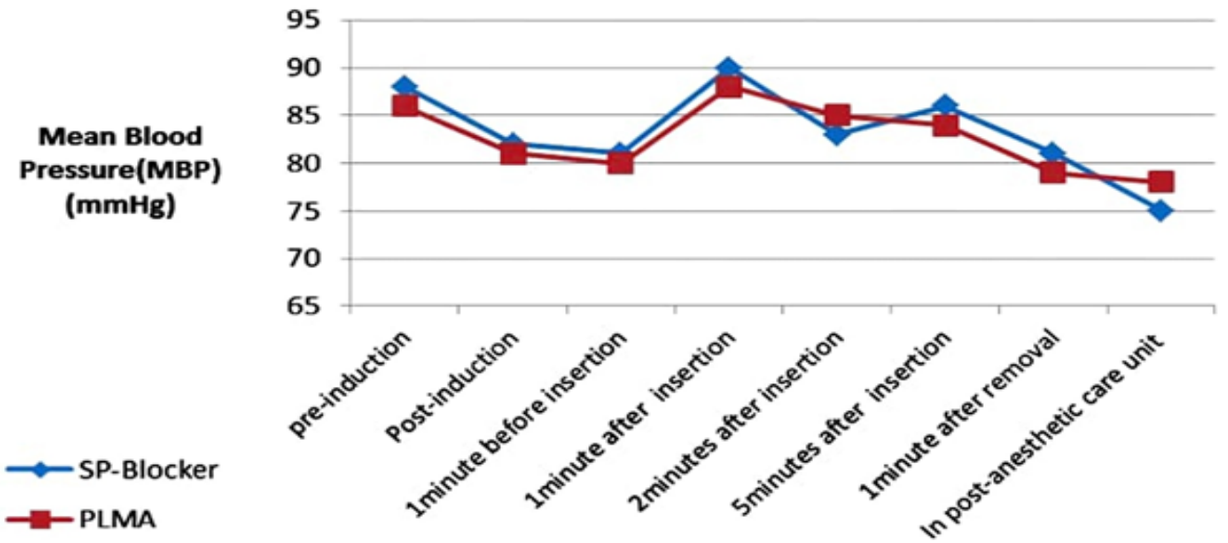

Fig. 5: Comparison between Air Q SP Blocker group and PLMA group in relation to the changes in the mean blood pressure(MBP)(mmHg)

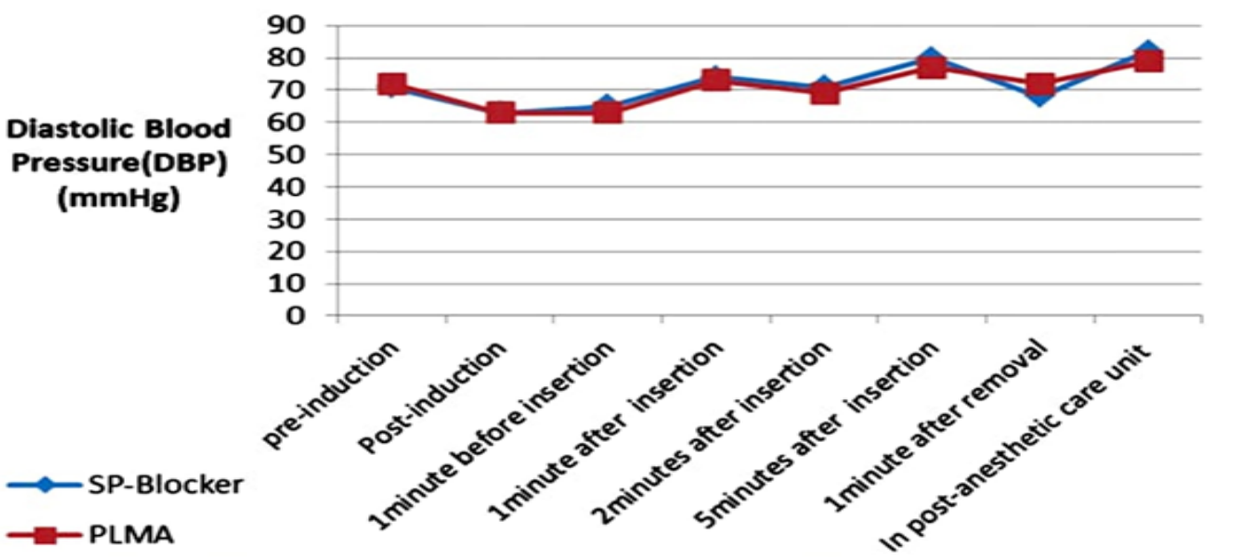

Fig. 6: Comparison between Air Q SP Blocker group and PLMA group concerning the changes in the diastolic blood pressure(DBP)(mmHg).

Table 6 showed the description of lung mechanics of both groups at T1 (10min.post-device insertion while patient in neutral position) and T2 (15min. post-pneumoperitonium with CO_2); where SP-Blocker group recorded statistically significant elevation in mean OLP, decreased mean PAP, lower mean plateau airway pressure, increased mean ITV, increased mean ETV, decreased mean LV, decreased mean LF with higher mean dynamic lung compliance. in comparison to PLMA group at T1 and T2. In addition, intra-group comparisons at T2 with referral to T1 showed significant higher OLP, PAP, plateau airway pressure, LV, LF and airway resistance with significant lower dynamic lung compliance without detectable changes in ITV and ETV over time.

Table 6: Lung Mechanics.

Time point	T1			T2		
parameter	SP Blocker(*n*=50)	PLMA(*n*=50)	*p value*	SP Blocker(*n*=50)	PLMA(*n*=50)	*p value*
OLP(cmH_2O)	33.41±2.38	30.64±2.12	<0.0001	35.14±2.8*	31.84±2.39*	<0.0001
PAP(cmH_2O)	14.39±0.31	16.68±1.24	<0.0001	21.6±0.47*	25.3±1.86*	<0.0001
Plat airway pressure (cmH_2O)	12.05±0.11	15.2±1.3	<0.0001	18.08±0.17*	22.8±1.95*	<0.0001
ITV(ml)	571.2±66.7	514.6±63.5	<0.0001	599.1±78.4	549.3±67.8	0.0010
ETV(ml)	546.5±61.3	470.7±78.7	<0.0001	555.7±67.7	492.2±68.5	<0.0001
LV(ml)	25±4.6	44±8.7	<0.0001	40±6.3*	57±8.5*	<0.0001
LF(%)	3.5±1.04	5.8±1.97	<0.0001	6.5±2.17*	9.7±3.4*	<0.0001
C_{dyn}.(ml/cmH_2O)	50.5±11	46.3±8	0.031	26.5±6*	24±3*	0.0098
R_{aw}.($cmH_2O/L/s$)	7.04±1.16	7.53±2.44	0.203	10.04±6*	10.53±4.5*	0.6451

Continuous normal-variables are presented as mean ±SD(means compared by using Student's t test, and SD compared by using F test). categorical data are presented as numbers using Chi squared test. $p>0.05$: statistically insignificant. $p<0.05$: statistically significant. Intra-group comparisons in T2 with referral to T1 are marked by (*) (which is meaning statistically significant i.e., $p<0.05$). T1(10min.post-device insertion while patient in neutral position) and T2(15min. post-pneumoperitonium with CO_2).

DISCUSSION

The investigators reported that SP-Blocker group was with higher OLP, lower PAP & plateau airway pressure, higher ITV & ETV, lower LV & LF with increased dynamic lung compliance. with regard to PLMA group at T1(10min. post-device insertion while patient in neutral position) and T2 (15min. post-pneumoperitonium with CO_2). Within each group there were significant higher OLP, PAP, plateau airway pressure, LV, LF and airway resistance with significant lower dynamic lung compliance at T2 with referral to T1 without detectable changes in ITV and ETV over time. In addition to successful insertion and effective ventilation of the two devices that were attained in the 1st trial in all cases, SP Blocker group provided hemodynamic stability the same as that achieved by PLMA without gastric insufflation, regurge, or gastric aspiration during the operation in both groups.

SAD provides an alternate airway to conventional tracheal intubation with great advantages, such as being easily inserted and reduced laryngopharyngeal morbidity. Nevertheless, it caused more leakage in comparison with an endotracheal tube because of the structural properties. So, the OLP is an essential factor in choosing the usage of SAD. When OLP values became greater than PAP values, airway could be safely maintained. Generally, intra-abdominal pressure was proved to be higher by about 15 mmHg during laparoscopic surgeries[17]. Hence, PAP is increased by about fifty percent, and lung compliance is reduced by about twenty five percent[18-20]. Of note, laparoscopic operations produce more undesirable ventilatory conditions in comparison with general types with decreased PAPs. Thus, evaluation of the functions of SAD during laparoscopic operations with increased PAPs that produce the above-mentioned unfavorable outcomes, is more suitable. Ultimately, SAD with an elevated OLP value compared to PAP is preferred for laparoscopic surgeries.

In the current study, OLP of SP-Blocker was higher than that measured with PLMA at T1 and T2. Another study concluded that inflatable SAD including LMA Supreme and PLMA, showed increased OLPs in comparison with that of non-inflatable SAD like i-gel[21]. As the cuff of SP Blocker is connected with its central channel, as airway pressure is elevated within the inspiration, cuff inflation occurs, ensuring firm attachment to the nearby surfaces. Thus, SP Blocker was proved to have higher OLP, and it might be applicable in operations like gynecology

surgeries that should be done by laparoscopy, in which the cases are placed in the Trendelenburg position that causes more increase in the PAP.

Multiple studies concluded safe and efficient usage of LMA Classic equipment in cases subjected to laparoscopic surgeries[22,23]. Similarly, other equipment like PLMA, have been assessed and give efficient MV and have been employed safely during laparoscopic surgeries[24,25].

Using a cadaver model, it was concluded that PLMA as well as cLMA made a firmer sealing in comparison with I-gel[26]. PLMA was intended to support controlled ventilation and protect the airway, moreover it was revealed that PLMA had considerable advantages over classic LMA and tracheal tube in specific conditions such as laparoscopic gynecologic surgeries[27].

Although PLMA is made of silicone that conforms properly to the supraglottic structures in comparison with PVC with maintained pressure inside the cuff at 60 cmH_2O, a significant elevation of OLP was reported in SP Blocker group owing to better closure by non inflatable cuff of SP Blocker[5,28] in addition to the distinct design criteria that included anterior curvature of the airway tube that enable approximation of oropharyngeal airway offering stable end to end coupling with glottis, masking ridges that help bowl stabilization in a transverse position, and elevated posterior heel height that help better sealing at the tongue. As SP Blocker is designed to be fitted to the posterior pharyngeal wall with good alignment of the airway tube to the laryngeal inlet leading to marked elevation of the OLP during the whole duration of the operation in comparison to PLMA, so this might explain considerable elevation in ITV and ETV with subsequently considerable reduction in LV and LF with SP Blocker in comparison to PLMA.

Despite the investigators ensured adequate anesthesia depth in the two groups, SP Blocker group presented with significant decrease in PIP and elevated C_{dyn} compared to PLMA group and this might be attributed to SP-Blocker design that provide lesser resistive load compared to PLMA design.

Our study reported SP Blocker required less time to be inserted in comparison with PLMA as SP-Blocker is unlike PLMA doesn't contain an inflatable cuff that required time for inflation and adjustment of the volume. The current study result was matched with researches proved that the pre curved stiffer PVC made Air Q™ or SP Air Q™ needed shorter duration for insertion in comparison with PLMA that produced more friction against the mucosa of tongue, palate and hypopharynx[29-31]. This documented that prior 40 SP-Blocker insertions became valuable for its appropriate placing. Nonetheless, it is important to highlight that decreased time needed for SP-Blocker insertion by 2 sec in comparison with PLMA might not be of great significance except if an interval of hypoxia occurred before SAD insertion.

Nevertheless, insignificant difference was determined between both groups as regard easy insertion of SAD as well as the 1st attempt insertion success rates. These results are coherent with previously carried out comparisons including; Air Q ILA compared to PLMA[32], Air Q SP compared to PLMA[33] and Air Q Blocker compared to PLMA[34], that concluded similar easiness of insertion and 1st-attempt insertion success rates within each group yet with markedly decreased insertion time of Air Q ILA, Air Q SP and Air Q Blocker in comparison with PLMA. On the other hand, our trial was in contrast to another study that compared Air Q Blocker and PLMA which documented shorter insertion time and an elevated success rates of insertion in the 1st time with more easiness of insertion in PLMA group compared to Air Q Blocker group[35], whereas ***Moorthy et al.***, reported non- significant differences between Air Q ILA and PLMA as regard insertion time, easiness and trials of insertion[36]. Easiness of insertion of SP-Blocker was in accordance with another study that showed easily inserted Air Q[37], yet contrary to another study that documented that Air Q SP insertion became harder in spite of the less time needed for insertion[38]. Successful insertion of SP-Blocker was achieved at the 1st attempt as Air Q ILA[39] and Air Q SP[4,40].

The two compared groups revealed insignificantly decreased incidence of LPM manifestations at 1&4h following surgery and this might be due to reduced risk of cuff over inflation in SP Blocker group with consequently less pressure applied on the wall of the pharynx reducing the airway morbidity, moreover intra cuff pressure of PLMA was kept at 60 cmH_2O during the whole duration of our study. Our results were agreed with ***Youssef et al.***,(2014)[34] yet in contrary to another study that compared Air-Q ILA and PLMA as it revealed more symptoms of LPM in Air Q group than PLMA group essentially presence of blood on the device when removing it and sore throat pain with Odynophagia at 24h follow up[32].

CONCLUSIONS

The vast majority of the diagnostic laparoscopic procedures in gynecology are office maneuvers of short duration and thus the supraglottic equipment that might help preventing of endotracheal tube complications are considered a suitable emerging alternate option.

Limitations: All of the insertions were carried out by experienced anesthesiologists in cases without any airway abnormality. Small sized sample is another limitation.

AUTHORS CONTRIBUTIONS

- Reham Ali Abdelhaleem Abdelrahman: participation in the research selection, participation in the development of the research plan regarding design, execution, analysis and interpretation of the work, drafting and revising the manuscript critically for important intellectual content and conduction of a medical questionnaire for the research.
- Nesrine Abdelrahman El-refai: giving final approval of the version to be published.
- Mohammad Fouad Algyar: taking accountability for all aspects of the work including accuracy and validity of the contents.
- Ahmed Mohamed El Kashef: collection of the scientific material.

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CONFLICT OF INTERESTS

There is no conflicts of interest.

PRESENTATION

None.

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دراسة مقارنة بين جهاز مجرى الهواء ذاتى الضغط Air-Q مع مانع التسرب وقناع الحنجرة Proseal أثناء تنظير البطن التشخيصى

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الخلفية: يُعد قناع الحنجرة بروسيل (ProSeal Laryngeal Mask Airway - PLMA) جهازًا معروفًا ومُعتمدًا يُستخدم في إدارة مجرى الهواء، بينما يُعد جهاز "إير-كيو ذاتي الضغط مع الحاجز" (Self-Pressurized Air-Q with Blocker - SP-Blocker) من الأجهزة الحديثة فوق المزمارية لإدارة مجرى الهواء.

الأهداف: قام الباحثون بمقارنة جهاز SP-Blocker مع جهاز PLMA أثناء التخدير العام (GA).

والمرضى الطرق: شملت الدراسة 100 امرأة من الفئة الأولى والثانية حسب تصنيف الجمعية الأمريكية لأطباء التخدير (ASA I & II)، خضعن لتنظير بطن نسائي تشخيصي في وضع ترينديلينبورغ تحت التخدير العام. تم توزيع المشاركات عشوائيًا إلى مجموعتين متساويتين: مجموعة SP-Blocker ومجموعة PLMA كانت النتيجة الأساسية هي

ضغط التسريب في البلعوم الفموي [(Oropharyngeal Leak Pressure - OLP)] وشملت النتائج الثانوية كلاً من: الضغط الهوائي الأقصى، الضغط الهوائي في مرحلة الهضبة]

حجم الشهيق المدخول [(Inspiratory Tidal Volume – ITV)]،

حجم الزفير الخارج [(Expiratory Tidal Volume - ETV)]،

حجم التسريب [(Leak Volume - LV)] نسبة التسريب [(Leak Fraction - LF)]الامتثال الديناميكي للرئة [(Dynamic Lung Compliance - Cdyn)] ومقاومة مجرى الهواء [(Airway Resistance - Raw)] تم قياس النتائج الأساسية والثانوية في الزمن (T1) بعد 10 دقائق من إدخال الجهاز والمريضة في الوضع المحايد (والزمن T2) بعد 15 دقيقة من بدء النفخ بالبطن باستخدام ثاني أكسيد الكربون.

النتائج: في الزمن T1: أظهر جهاز SP-Blocker متوسطًا أعلى لضغط التسريب في البلعوم الفموي 33.41±2.38) سم ماء(مقارنة بجهاز PLMA(30.64±2.12 سم ماء) (مع فاصل ثقة 95% يتراوح من 3.67- إلى 1.88-، وقيمة معنوية، (p<0.0001. كما سُجّل ارتفاع في متوسط حجم الشهيق (ITV) في مجموعة SP-Blocker (571.2±66.7 مل(مقارنةً بـ 514.6±63.5) PLMA) مل) بفاصل ثقة 95% من 82.45- إلى 30.75-، وقيمة p=0.041 كذلك زاد متوسط حجم الزفير (546.5±61.3) (ETV)مل مقابل 470.7±78.7) مل بفاصل ثقة 95% من 103.8- إل 47.8-، (p<0.0001) و (انخفض متوسط كل من حجم التسريب ونسبة التسريب) كما (تحسن الامتثال الديناميكي للرئة (Cdyn) مل/سم ماء (p=0.031)) فى جهاز SP-Blocker مقارنةً بجهاز .PLMA في الزمن T2: استمرت الفروقات بين الجهازين على نفس النمط كما في .T1 وكان متوسط زمن إدخال الجهاز أقل في مجموعة SP-Blocker مقارنةً بـ (18.21±3.8) PLMA ثانية مقابل 20.36±4.33 ثانية؛ بفاصل ثقة 95% من 0.53 إلى 3.77، .(p=0.0097) لم تُسجّل فروق ذات دلالة إحصائية بين المجموعتين من حيث سهولة الإدخال، عدد المحاولات، مقاومة مجرى الهواء، المضاعفات الحنجرية البلعومية بعد الجراحة، أو المؤشرات الديناميكية الدموية في مختلف نقاط القياس.

الاستنتاجات: يُعد جهاز SP-Blocker بديلًا فعّالًا ومكافئًا لجهاز PLMA من حيث الكفاءة في إدارة مجرى الهواء تحت التخدير العام.