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RESEARCH

EFFECT OF LARYNGEAL MASK CUFF PRESSURE ON POSTOPERATIVE PHARYNGOLARYNGEAL MORBIDITY IN GERIATRIC PATIENTS

ABSTRACT

Introduction: In many of the world's developed regions, the geriatric population forms a rapidly increasing portion of the total population. Therefore the vast majority of daily operating schedule constitutes the elderly patients. Pharyngolaryngeal complications are indicators of quality geriatric patient care. This study compared postoperative pharyngolaryngeal morbidity in geriatric patients managed with manometers to limit the laryngeal mask intracuff pressure (60 cmH_2O) with geriatric patients under routine care.

Materials and Method: Over 65 years of age with indications for elective surgery requiring laryngeal mask insertion were included in this prospective randomized and double-blind study. The Laryngeal Mask Unique intracuff pressure was measured with a manometer and recorded. In the pressure limiting group, LMU intracuff pressure was adjusted equal to 60 cmH_2O (44 mmHg). No intervention was performed in the routine care group. Ventilation parameters evaluated in the peroperative period, and throat pain, dysphonia and dysphagia were evaluated in the 1st and 24th hour postoperative.

Results: In the study, the throat pain ($p< 0.001$), dysphonia ($p< 0.001$) and dysphagia ($p=0.007$) in the Group Pressure Limiting at postoperative 1st hour group were statistically significantly lower than in the in the Group Rutine Care. In the 24th hour postoperative throat pain ($p< 0.001$), dysphonia ($p=0.022$) and dysphagia ($p=0.042$) were statistically significantly lower in the Group Pressure Limiting.

Conclusion: According to the results of this study, the conclusion was reached that limiting the cuff inner pressure reduced postoperative pharyngolaryngeal complications in geriatric patients using Laryngeal Mask Unique.

Key Words: Aged; Laryngeal Mask; Postoperative Complications.

ARAŞTIRMA

GERİATRİK HASTALARDA LARİNGEAL MASKE KAF BASINCININ POSTOPERATİF FARİNGOLARİNGEAL KOMPLİKASYONLAR ÜZERİNE ETKİSİ

ÖZ

Giriş: Dünyanın birçok gelişmiş bölgesinde toplam nüfusun en hızlı artan bölümünü geriatrik popülasyon oluşturmaktadır. Bu nedenle günlük operasyon çalışma programının büyük çoğunluğu yaşlı hastalar oluşturmaktadır. Geriatrik hastalarda faringolaringeal komplikasyonlar hasta bakım kalitesinin belirleyicisidir. Bu çalışmada, rutin bakım uygulanan geriatrik hastalar ile manometre ile laringeal maske kaf içi basınç sınırlaması (60 cmH_20) yapılan geriyatrik hastalarda postoperatif faringolaringeal morbidite karşılaştırıldı.

Gereç ve Yöntem: Çalışma, 65 yaş üstü 90 hasta ile prospektif, randomize ve çift kör, laringeal maske yerleştirilme endikasyonu olan elektif cerrahilerde yapılmıştır. Tüm hastalarda, Laringeal Maske Unique kaf içi basınç değerleri bir monometre ile ölçülerek kaydedildi. Kaf içi Basınç Sınırlama Grubu'nda kaf içi basınçları 60 cmH_2O (44 mmHg) olacak şekilde ayarlanırken, Rutin Uygulama Grubu'nda sadece ölçülen basınç değeri kaydedildi. Peroperatif dönemdeki ventilasyon parametreleri ve postoperatif 1. ve 24.saatte boğaz ağrısı, yutkunma güçlüğü ve ses kısıklığı değerlendirildi.

Bulgular: Bu çalışmada, basınç sınırlı grupta postoperatif 1.saatte boğaz ağrısı ($p<0.001$), yutkunma güçlüğü ($p=0.007$) ve ses kısıklığı ($p<0.001$) rutin uygulama grubuna göre karşılaştırıldığında istatistiksel olarak anlamlı olarak düşük bulundu. Basınç sınırlı grupta 24. saatte boğaz ağrısı ($p<0.001$), yutkunma güçlüğü ($p=0.042$) ve ses kısıklığı ($p=0.022$) rutin uygulama grubuna göre karşılaştırıldığında istatistiksel olarak anlamlı olarak düşük bulundu.

Sonuç: Bizim çalışmamızın bulgularına göre geriatrik hastalarda Laringeal Maske Unique uygulamalarında kaf içi basınç sınırlaması yapılmasının postoperatif faringolaringeal komplikasyonların azalmasına neden olduğu sonucuna varılmıştır.

Anahtar Sözcükler: Yaşlılık; Laringeal Maske; Komplikasyon; Postoperatif.

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INTRODUCTION

The geriatric patient population represents a wide group. Therefore, it is important to evaluate each aspect of anaesthesia management in this geriatric population (1).

The laryngeal mask airway (LMA) is widely used for airway management during anaesthesia. A recent survey reported that the use of a supraglottic airway device (SGAD) as a primary airway management device for general anaesthesia is as high as 56.2% (1). These devices have advantages over endotracheal intubation, such as fewer skills required for insertion and the ability to be used in difficult airway situations.

Currently, major complications are rarely observed with the use of LMAs. Pharyngolaryngeal morbidity linked to laryngeal mask use is related to correct choice of mask size, technique of placement, correct position of the LMA on the larynx, cuff volume and cuff pressure (2). The ideal cuff of a SGAD should provide good airway seal during positive pressure ventilation and protect against pulmonary aspiration without causing trauma to the surrounding structures. During laryngeal mask use, the high pressure of the laryngeal mask cuff with pressure on the pharyngeal mucosa and reduction in pharyngeal perfusion may cause the development of postoperative complications such as sore throat, dysphonia and nerve damage (3). However, the incidence of minor complications such as sore throat, dysphonia and dysphagia causing patient dissatisfaction after operations is very high, and studies have shown that this rate varies from 20 to 50% (4-7). It has been stated that keeping laryngeal mask cuff pressure below 45 mmHg (60 cmH_2O) can prevent pharyngolaryngeal morbidity related to laryngeal masks, and it has been shown that using a manometer after LMA placement to limit pressure within the cuff can reduce this morbidity by nearly 70% (2,5).

There are few studies commenting on pharyngolaryngeal morbidity, especially in group elderly (8).

We hypothesize that the routine use of manometry to measure and limit the intracuff pressure less than 60 cmH_20 may reduce the incidence of postoperative pharyngolaryngeal morbidity. The objective of this randomized controlled trial was to compare the incidence of postoperative pharyngolaryngeal morbidity in the geriatric age group managed with manometers to limit intracuff pressure with geriatric patients under routine care of Laryngeal Mask Unique® (LMU) insertion without the use of manometry.

MATERIALS AND METHOD

This study was registered in ClinicalTrials.gov (Identifier: NCT02189954) on July 7, 2014 by Sule Ozbilgin after IRB approval (Dokuz Eylul University Ethics Committee for Clinical Researchers, protocol number: 269-GOA, approval number: 2011/23-02, Izmir, Turkey), and written informed consent was obtained. Ninety patients above the age of 65 in the American Society of Anesthesiologists (ASA) physiological classification group I-III, undergoing elective surgery and with indication for LMA placement participated in this prospective, randomized and double-blind study.

Patients with recent history of upper respiratory tract infection, obese patients with body-mass index above 35 $kg.m^2$, symptomatic hiatus hernia, contraindications for LMA use such as severe gastroesophageal reflux, or those with dementia and who could not cooperate were excluded from the study.

Every patient was preoperatively evaluated, and ASA and Mallampati classifications were recorded. Patients taken to the operating room received standard monitoring [electrocardiography (ECG), pulse oxymetry, non-invasive blood pressure, capnogram)] and bispectral index (BIS) monitoring [BIS-Vista ™ (Aspect Medical Systems; Newton; MA, USA)] before anaesthesia induction.

After patients were preoxygenised with 6 $L.min^{-1}$ oxygen through a face mask for 3 minutes, anaesthesia induction was provided by 0.02 $mg.kg^{-1}$ midazolam (Dormicum® ampoule, Roche Company Limited, Istanbul), 1-2 $\mu g.kg^{-1}$ fentanyl (Fentanyl® 0.05 $mg.ml^{-1}$ampoule Jansen Pharmaceutica N. V., Belgium) and 1-2 $mg.kg^{-1}$ propofol (Propofol %1 Fresenius® Fresenius Kabi, Sweden). During ventilation, Guedel-type airway was not used unless there was ventilation difficulty with the face mask. Before insertion, the LMU used in daily routine was lubricated with a water-based gel, and the cuff was completely deflated. After induction, when BIS values were between 40 and 60 and sufficient chin relaxation was obtained, LMU was inserted by an anaesthetist with more than five years of experience. A size 3 LMU was used in weighing less than 50 kg; and a size 4 LMU was used 50-90 kg. and a size 5 LMU was used more than 90 kg. in patients. The placement method was according to the manufacturer's instructions. All patients were ventilated by a breathing circuit with heat and moisture filter.

After the laryngeal mask was inserted, the cases were manually ventilated so that peak inspiratory pressure was less than 20 cmH_2O, and the cuff of both groups was inflated with a 20 ml injector until the leak sound ceased. Regular end-tidal CO_2 curves and chest movement showed successful insertion and ventilation. During attempts, depending on the patients' reactions and with the requirement of keeping BIS

values between 40 and 60, additional doses of 0.5 mg.kg^{-1} propofol were administered.

After LMU was fixed and anaesthetic depth was sufficient (BIS between 40 and 60), the cuff pressure of the LMU was measured with a manometer (cuff pressure manometer, Rüsch, Germany). Groups were divided into 2 groups using a random number table. In the group with cuff pressure limitation (Group PL, n=45), cuff pressure was held at 60 cmH_2O (44 mmHg) (5), while in the routine care group (Group RC, n=45) pressure was only measured and recorded.

Anaesthesia was maintained with 50% air in O_2 and 1.5-2.5% sevoflurane and additional 0.5 mg.kg^{-1} propofol doses to keep BIS between 40 and 60. All patients were ventilated with positive pressure ventilation with a tidal volume of 7-8 ml.kg^{-1}, inspirium: expirium ratio 1:2 and end-tidal CO_2 ($ETCO_2$) held between 30 and 35 mmHg. Oropharyngeal leak pressure (OLP) measurement was recorded as the pressure value when a leak sound was heard from the mouth after the expirium valve was closed and fresh gas flow was reduced to 3 L.min^{-1}. OLP was measured immediately after the laryngeal mask was inserted, every 5 minutes in the first half hour and every 15 minutes afterwards. At the same intervals, tidal volume, mean airway pressure, end tidal carbon dioxide levels and SpO_2 values were also recorded. If the operation lasted more than 1 hour, a second manometric measurement was taken; pressure was adjusted to 60 cmH_2O in the pressure limited group and only recorded in the other group.

After the operation, the LMU were removed when the patients were awake and could open their mouths on command; unless necessary, oropharingeal suction was not applied. In the study protocol, the placement ease of the LMU, number of attempts, duration of surgery, airway use, laryngospasm incidence, total fentanyl dose, presence of blood on the LMU after removal and application of pharyngeal suction was recorded. After anaesthesia, the patients were monitored in the recovery unit, and analgesia was provided by 5-10 mg intravenous meperidine titration and nonsteroidal anti-inflammatory drugs (NSAID). A researcher blind to the groups recorded sore throat, dysphonia and dysphagia in the 1st and 24th hour, classifying as none, slight, moderate and severe (4). Cases developing rare complications of recurrent laryngeal nerve, hypoglossal nerve and lingual nerve paralysis were recorded. The cases were transported to the ward when Aldrete scoring criteria were appropriate. Cases discharged early from the ward had 24th hour evaluation completed by telephone communication.

Statistical Analysis

In statistical analysis for 96.6% power, the groups comprised 45 people. Data, percentage, average, standard deviation and median have been shown with their minimum and maximum values. Chi Square Test was used for categorical variables; for constant variables, at test was used when suitable for normal distribution, and when unsuitable for normal distribution, a Mann Whitney U was used for analysis. $P < 0.05$ was considered significant. All statistics were performed using SPSS (Statistical Package For Social Sciences, Chicago, IL, USA) version 15.0.

RESULTS

A total of 90 patients were included in the study. Demographic and operative properties of both groups were similar (Table 1). All the LMA devices were inserted on either first or second attempt. No ventilation failure occurred within the 2 groups.

The success of the first attempt insertion in the pressure limited group was 88.9%, while in the routine care group this rate was 86.7% (p=0.748). Immediately after insertion, the LMU cuff inner pressure was 92.7±20.5 in the PL group (mean±sd), while this was 82.2±22.2 cmH_2O in the RC group (p=0.222). There was no statistically significant difference between the groups in terms of number of attempts. None of the patients developed serious complications such as laryngospasm, pulmonary aspiration or nerve damage.

There was no significant difference found between OLP values of the PL group and the RC group (p=0.514). The average in the pressure-limited group was 22.02±6.44 cmH_20, while the average in the RC group was 22.93±6.75 cmH_2O.

The throat pain, dysphagia and dysphonia complications in the groups at the postoperative 1st and 24th hour are shown in Table 3. The throat pain (p< 0.001), dysphonia (p<0.001) and dysphagia (p=0.007) in the PL group in the postoperative 1st hour were statistically significantly lower. In the PL group at the 24th hour, there was a statistical difference found in throat pain (p< 0.001), dysphonia (p=0.022) and dysphagia (p=0.042).

When comparements for throat pain, dysphagia and dysphonia at the 1st and 24th postoperative hours in each individual group were performed (p=0.046). For dysphonia (p=0.100) and dysphagia, there was no significant change between the 1st and 24th hour in the PL group. In the RC group, the throat pain (p=0.033), dysphonia (p=0.014) and dysphagia (p=0.008) were significantly reduced at the 24th

Table 1— Demographic Characteristics and Operative Data for Patients.

Groups	Pressure Limiting (n=45)	Routine Care (n=45)	p
Baseline Characteristics			
Age (year) (mean±SD)	72.8±6.2	71.9±5.4	0.428
ASA (1/2/3)	10/31/4	8/35/2	
Mallampati (I/II/III)	26/18/1	29/14/2	
Gender (males/females)	22/23	23/22	0.833
Weight (kg) (mean±SD)	75,2±11.9	69.6±11.9	0.038
Operative Characteristics			
Anesthesia Duration (min) (mean±SD)	55.6±33.1	57±31.6	0.808
Ease of LMU insertion (Easy/fair/difficult)	39/6/-	32/12/1	
Attempts for LMU insertion (1/2)	40/5	39/6	0.748
Types of Surgery			
- Eye	3	6	
- Urology	32	30	
- Gynecologic	2	5	
- General surgery	7	3	
- Plastic and reconstructive	1	1	
Fentanyl Intraoperatively (µg) (mean±SD)	97.1±48.6	98.5±51.9	0.426
Meperidine Postoperatively (mg) (mean±SD)	18.3±4.9	19.5±6.3	0.497
Postoperative NSAID (yes/no)	1/44	3/42	0.616

ASA= American Society of Anesthesiologists; LMU= Laryngeal Mask Unique; NSAID= Nonsteroideal antiiflamatuar drugs.

Table 2— Details of Airway Management.

Groups	Pressure Limiting (n = 45)	Routine Care (n = 45)	p
LMU size (3/4/5)	2/36/7	5/39/1	0.442
The first measured cuff pressure (cmH_2O) (mean±SD)	92.75±20.53	87.20±22.27	0.222
Amount of air deflated (in ml) (mean±SD)	3.41±2.54	-	
Oropharyngeal leak pressure (cmH_2O) (mean±SD)	22.02±6.44	22.93±6.75	0.514
Guedel-type airway use (%)	-	2.2	1.000
Pharyngeal suctioning (%)	-	-	
LM blood-stain (no blood/trace amounts/marked)	42/3/-	40/5/-	0.714

hour compared to the 1st hour (Table 3). When the LMU was removed, the percentage with trace amounts of blood was 6.7% in the PL group, while this rate was 11.1% in the RC group. Significant amounts of blood on the LMU after removal were not observed in any group.

When the intraoperative ventilation parameters were compared, there was no statistically significant difference between the groups in terms of average airway pressure (p=0.875), peak airway pressure (p=0.698), tidal volume, peripheral oxygen saturation and end-tidal carbon dioxide values (p=0.669).

The intraoperative fentanyl usage was the same between the two groups (Table 1). The postoperative meperidine consumption (mean±sd) in the PL group was 18.39±4.91 and 19.53±6.39 in the RC group, with no statistically significant difference found.

Discussion

Our study showed that when the cuff pressure of the LMU inserted in patients above 65 years of age was regulated to 60 cmH_2O, there was a reduction in postoperative pharyngolaryngeal morbidity.

Hyperinsufflation of the LMA cuff may cause damage due to high pressure on the structures of the larynx and pharynx. High LMA cuff inner pressure may cause a reduction in the

Table 3— Pharyngolaryngeal Discomfort Evaluation.

Groups	Pressure Limiting (n = 45) Median (min-max)	IQR	Routine Care (n = 45) Median (min-max)	IQR	p*
Sore throat					
at 1 h	1(1-2)	0.00	1 (1-4)	0.00	<0.001
at 24 h	1 (1-1)		1 (1-3)		<0.001
p value**	0.46		0.033		
Dysphonia					
at 1 h	1 (1-1)	0.00	1 (1-3)	0.00	< 0.001
at 24 h	1 (1-1)		1 (1-3)		0.022
p value**	1.00		0,014		
Dysphagia					
at 1 h	1 (1-2)	0.00	1 (1-3)	0.00	0.007
at 24 h	1 (1-1)		1 (1-2)		0.042
p value**	0.157		0.008		

*p: Mann Whitney U test.
**p: Wilcoxon-signed rank test.
IQR: Interquartile range.

perfusion pressure of capillaries in the pharynx mucosa. Though it may be rare in surrounding tissues, nerve damage may form as a result of trauma related to pressure (9,10). Additionally, the high cuff inner pressure in LMA cuff hyperinsufflation may cause an increase in postoperative pharyngolaryngeal morbidity, especially throat pain (11,12). As recommended by the manufacturing company, the LM cuff pressure should not exceed 60 cmH_2O.

Seet et al.(5) recently demonstrated that intracuff pressure exceeds normal limits when used for anaesthesia. They reported that when the LM cuff insufflation is routinely made, high rates of incidence of composite pharyngolaryngeal adverse events at 45.6% are seen, but when it is checked with a manometer, the incidence falls to 13.4%. Additionally, this study found that the incidence of throat pain in the 24th hour was lower in the pressure limiting group compared to the routine care group (13.6 vs. 3.1%, p=0.008). As a result of their study, they recommended the routine use of pressure manometers when the LM is first placed.

While 4 similar studies in the adult population showed that reducing LM cuff inner pressure and volume reduced postoperative pharyngolaryngeal complications (4,13,14) other studies have not showed any relationship between the two (2,15,16). Brimacombe et al. (4) showed in a randomized controlled trial that inflation of the LMA cuff with a smaller volume of air (15-20 ml) was associated with a decreased incidence of the primary outcome of sore throat at 18–24 h postoperatively (20 vs. 42%, p< 0.04) compared with a larger volume of air (30–40 ml). Burgard et al (13), were to investigate the effect of cuff pressure reduction on postoperative sore throat in LMA anaesthesia. They were reported postoperative sore throat can be reduced when cuff pressure is continuously monitored and kept on low-pressure values. However, they have used nitrous oxide and oxygen for maintained anaesthesia in both study. The studies which report no relation between LMA cuff pressures and postoperative pharingolaryngeal complications have nitrous oxide usage (17,18) and lower sample size (17) study group. This makes conflict effect upon results. Several confounding variables may have affected pharyngolaryngeal adverse events. We didn't use nitrous oxide in our study, we excluded two important effect; nitrous oxide usage and experienced practitioner. Several confounding variables may have affected pharyngolaryngeal adverse events. Yurtlu et al. (2) have showed that experience of the anesthesia team practitioners does not have an influence on accurate determination of LMA cuff pressure and related pharyngolaryngeal adverse event incidences.

Schloss (12) evaluated the incidence of LMA hyperinflation and determined that 53% of subjects had an LMA intracuff pressure equal to or exceeding 60 cmH_2O. They concluded that a significant percentage of patients have an intracuff pressure greater than the generally recommended upper limit of 60 cmH_20 (used nitrous oxide). In a prospective study by Haldar and Immanuel, they found that the cuff pressure of the

inserted LMA was above 44 cmH_2O in 76% of patients (19). A more worrying situation is that of these, 48% had cuff inner pressure measurements recorded above 88 mmHg. This high LMA cuff pressure was recorded as 132 mmHg at the start of anaesthesia and as 153 mmHg at the end of the case by Lenoir (20), and the previous results were confirmed (used nitrous oxide). Seet reported an average LMA cuff pressure of 107 mmHg. Thus, the majority of LMA cuff pressures significantly exceed the manufacturer's guidelines in anaesthetic practice (used nitrous oxide). Starting from this point, a variety of studies were completed on the use of an injector to provide the most appropriate volume to reach but not exceed target cuff pressure for LMA (21).

Over time, nitrous oxide can diffuse into the LMA cuff and increase the cuff inner pressure (16). Inhalation agents do not diffuse through LMU, a new type of SGAD. In addition, we consider that our use of air and oxygen in our study removed this factor and allowed us to more clearly evaluate the relationship between pharyngolaryngeal morbidity and LMU cuff pressure.

Brimacombe et al (18) measured the OLP values after inflating cuffs with 10, 20, 30 and 40 ml volumes and found they were 19±5, 25±4, 27±4 and 25±4 cmH_2O, respectively. The researchers showed that when the cuff volumes rose above 30 ml, the OLP values reduced. When Brimacombe et al (22) held the LMU cuff pressure at 60 cmH_2O and 180 cmH_2O, the OLP values were 18.0±5.8 cmH_20 and 15.6±4.6 cmH_20, respectively. The researchers concluded the lower OLP values at 180 cmH_2O pressure may be related to better placement of the LM at low cuff inner pressures (60 cmH_2O). Similarly, in a study by Keller et al (23), LM cuff inflation with increasing volumes increased the OLP values; however, when the volumes rose above 20 ml, they showed that the OLP values reduced. The researchers determined that inflating the LM cuff above 25 ml did not increase OLP values and improved fibreoptical imaging. In our study, while the OLP values in the pressure limited group were 22.02±6.44 cmH_2O, they were 22.93±6.75 cmH_2O in the routine care group. As a result, there was no significant difference between the groups in terms of LMA insertion and the markers of efficiency, ventilation parameters such as airway pressure and volume. The monitoring of anaesthesia depth by BIS may have been effective at preventing observation of any differences between the groups.

When different ventilation modes (spontaneous ventilation, pressure support and pressure control ventilation) were evaluated in a randomized, controlled study of the effect of manometer monitoring on pharyngolaryngeal side effects, when the LMA cuff pressure is prevented from exceeding 60 cmH_2O the pharyngolaryngeal discomfort reduced independently of ventilation mode (24).

In our study, in the postoperative 1st hour ($p<0.001$) and 24th hour ($p<0.001$), the incidence of throat pain in the PL group was found to be lower than in the RC group. Even though the population was geriatric, our findings comply with the findings of researchers such as Seet (5), Burgaard (13) and Karthick (25) in adult patients. We standardized the insertion procedures for the LMU in both groups. Though there was no statistical difference in both the cuff volume and cuff inner pressure values of the LMU in both groups, when the groups were evaluated from the point of view of postoperative pharyngolaryngeal morbidity, there was a statistically significant difference. While the pressure was not very different between the groups, the reduced volume in the PL group may have provided an advantage. In spite of the reduced volume, the leak did not repeat, and as a result, evaluating the inflation a short time after the cuff is inflated for the first time is the correct step in all LMA applications. We observed that the incidence of throat pain, dysphonia and dysphagia in the PL group in the postoperative 1st and 24th hour was lower. However we discovered statistically significant differences between sore throat, dysphagia and dysphonia in the first hour and 24 hours later. We may comment the reduction of pharingeolaryngeal complications after a while therefore the reduction of high cuff pressure effects in acute period.

In our study, sufficient depth of anaesthesia was monitored with BIS, and a standard postoperative analgesia protocol was followed. There was no significant difference in doses of peroperative fentanyl and postoperative meperidine.

In our study, the success on first insertion attempt was 88.9% in the PL group group and 86.7% in the RC group ($p=0.748$). In studies with LMU, the success rate on first attempt is reported as 88-100% (4,22). Our study complies with these.

A different aspect of our study population is that it was geriatric. While the average ages in other studies were 39±14 years for Brimacombe (4), 46±16 for Seet (5), and 49.1±13.0 for Karthik (25), our average age was 72.3±5.8 years. Along with accompanying diseases, the geriatric population carries a high risk of perioperative morbidity and mortality. Seventy-five percent of surgical cases in their seventh decade have one or more accompanying health problems. Hypertension, renal diseases, atherosclerosis, myocardial infarction and chronic obstructive pulmonary disease (COPD) are the most frequ-

ently observed accompanying diseases in geriatric cases. The number of accompanying diseases is a more important marker of prognosis in geriatric cases than age. The increase in accompanying diseases, especially COPD, increases the risk of apnoea and airway obstruction in the recovery period (1).

The mask ventilation can not be effective or enough in over 65 year old patients because of being edentulous, loose of tissue elasticity and muscle tone (25). The mask doesn't fit in cheeks and lead to air leakage in edentulous patients. The percentage of edentulous is 60% in over 65 year old patients (26) and this percentage is more then other age groups. Racine et al (27) observed difficult mask ventilation incidance 16% in the study betweeen edentulous patients. Therefore, LMA usage for anesthesiology practice in geriatric patients is more valuable. The procedures about this application and properties belongs to postoperative pharingolaryngeal care should be known well and appropriate strategies sould be thought.

Additionally, the frequency of repeated surgical procedures is higher in this patient group. As a result, LMA use without muscle relaxants to prevent exposure to postoperative residual effects has become the cornerstone of airway devices in the geriatric patient group. Furthermore, the provision of better hemodynamic conditions for laryngoscopy and endotracheal intubation continue to strengthen its popularity. Aspiration pneumonia is a potentially life-threatening complication. Arozulah et al (28) found the 30-day mortality incidence was 20% in patients with pneumonia. One of the reasons for a tendency to aspiration pneumonia is progressive reduction in pharyngeal and supraglottic sensitivity with increased age, and as a result this may contribute to dysphagia and development of aspiration in elderly patients (29).

It has been observed that LMA cuff pressure exceeds the manufacturer's recommendations in the majority of anaesthetic applications (6,21). Even in geriatric patients where all surgical procedures do not require neuromuscular blockers, routine aneroid manometer use to maintain LM pressure at the desired level may reduce the rate of laryngopharyngeal morbidity after the operation (6).

Limitations of our study include the lack of imaging with a fibreoptic bronchoscope after LMU placement and not evaluating the position in the hypopharynx of the supraglottic airway device in the geriatric age group.

In conclusion, the results of this study of the insertion of LMA in the geriatric age group and regulation of cuff pressure show that keeping cuff pressure below 60 cmH_2O reduces postoperative pharyngolaryngeal complications. However, further studies are required to research the effect of factors such as the use of pharmacological agents and appropriate choice of airway device size and experience on the postoperative pharyngolaryngeal complications especially in the geriatric age group.

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