UNIVERSITY OF KHARTOUM
FACULTY OF MEDICINE
POSTGRADUATE MEDICAL STUDIES BOARD

EXTRATRACHEAL AIRWAY MANAGEMENT IN
SPONTANEOUSLY BREATHING
ANAESTHETIZED PATIENTS

By

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MBBS (Ahfad University College)
٦٩٩١

A thesis submitted in partial fulfillment for the requirements of the Degree of Clinical MD in Anaesthesia & Intensive Care

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DEDICATION

To my parents,
   The candles that enlightened the path of my life

To my husband,
   For his unlimited help, support and love.

To my little sweetheart –my daughter (Hiyam)
   With great love and care.

To my sisters,
   Wishing them all the best.
ACKNOWLEDGEMENT

I would like to express my sincere gratitude to Dr. Kamal Mohammed ElHassan Mubasher for his appreciable supervision, constant help, suggestions and great care.

I am also grateful to Miss Amal Saeed, my little sister, Hiba for their efficient computer work.
ABSTRACT

A prospective randomized study was performed on eighty patients presented for elective minor surgical operations under general anaesthesia using extra tracheal airways and spontaneous breathing in Khartoum Teaching Hospital and Soba University Hospital during the period from March to October, 2001.

The patients were divided into two groups:-

1. Group 1: 40 patients in whom laryngeal mask airway was used.
2. Group 2: 40 patients in whom cuffed oropharyngeal airway was used.

The study aimed to analyze the efficacy and safety of laryngeal mask airway and cuffed oropharyngeal airway, safety and efficiency of the two devices, haemodynamic changes during insertion and intra- and post-operative complications.

The study concluded that the laryngeal mask airway as well as the cuffed oropharyngeal airway are safe and efficient in the management of spontaneously breathing anaesthetized patients.
البحث: معالجة الحرقة

تم إجراء دراسة شاملة على 84 حالة من الحرائق في فترتين:
1. البداية:
- استخدام قناع LMA
- استخدام COPA
- النتائج:
  - فعالية وسلامة العمليات خلال فترة العناصر وال движения.
  - ملاحظة الشعور بالشدة أثناء استخدام COPA.

2. النهاية:
- وصف الوضع والعلاج
- فوائد استخدام COPA
- قدرة العلاج على التقليل من الشدة خلال العملية.

*= CO & LMA*
LIST OF TABLES

1. Preoperative characteristics of patients undergoing minor surgical operations.

2. Mean haemodynamic differences using COPA & LMA.
LIST OF FIGURES

١. Type of surgery.
٢. Major intra-operative complications.
٣. Minor intra-operative complications.
٤. Immediate postoperative complications.
٥. Twenty-four hours postoperative complications.
**ABBREVIATIONS**

<table>
<thead>
<tr>
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<th>Description</th>
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<tr>
<td>COPA</td>
<td>Cuffed oropharyngeal airway</td>
</tr>
<tr>
<td>LMA</td>
<td>Laryngeal mask airway</td>
</tr>
<tr>
<td>KTH</td>
<td>Khartoum Teaching Hospital</td>
</tr>
<tr>
<td>SUH</td>
<td>Soba University Hospital</td>
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</table>
INTRODUCTION

A big number of surgical operations are done as part of our operation surgical lists. They are usually performed by inhalational technique using face mask and spontaneous ventilation. However using the face mask can prevent the anaesthesiologist from performing other tasks, such as patient monitoring, drug administration and record keeping. Moreover, maintaining an airtight seal with the face mask can be difficult in some clinical situations, such as edentulous patients\(^{(1)}\). For these reasons, the laryngeal mask (LMA), and more recently, the cuffed oropharyngeal airway (COPA) have been developed as alternative means to the use of face mask during anaesthesia. They are becoming increasingly popular for spontaneously breathing patients undergoing minor surgical procedures, are valuable in ophthalmic, nose and ear operations, and where difficulties with the airway is expected\(^{(1)}\). However, while the LMA has been largely evaluated with both conventional and non-conventional uses, the clinical experience with COPA is still limited\(^{(1)}\).

The aim of this study is to analyze the efficacy and safety of airway management using extratracheal airway, effects on
haemodynamics, and the pre- and postoperative complications of these devices.
OBJECTIVES

The objectives of this study are:-

1. To assess the efficacy and safety of extra-tracheal airway (LMA & COPA).

2. The haemodynamic changes during insertion.

3. The peri-operative complications of these devices.
LITERATURE REVIEW

The use of extratracehcal airway has changed clinical practice in anaesthesia after replacing face mask as well as endotracheal intubation. Since its introduction in ٨٨٩١, the LMA has gained widespread popularity amongst short surgical procedures, it is also used more often than endotracheal tubes in modern surgery units even in operations that traditional have been thought to require endotracheal intubation.

Laryngeal mask airway (LMA):-

The device consists of short conventional silicone tube with an elliptical cuff, inflated through a pilot tube, attached to the distal end. The cuff, which resembles a miniature face mask, has been designed to form an airtight seal around the posterior perimeter of the larynx. A variety of sizes of the cuff are available ranging from size ١ used in neonates to size ٥ in large adults. The mask is inserted and the cuff inflated until no air leak is detected. It is important to ensure that the maximum inflation volume is not exceeded. The device is very effective in maintaining a patient airway in spontaneously breathing patients as well as controlled ventilation.
The Sizes of LMA:-

<table>
<thead>
<tr>
<th>Size</th>
<th>Length of LMA</th>
<th>Size of Pt.</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>Neonates &amp; Infants 6.0 kg</td>
</tr>
<tr>
<td>1.5</td>
<td>10</td>
<td>Infants 5-10 kg</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>Infants &amp; children 10-20 kg</td>
</tr>
<tr>
<td>2.5</td>
<td>12.5</td>
<td>Children 20-30 kg</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>Children &amp; small adults 30-50 kg</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>Normal adults 30-50 kg</td>
</tr>
<tr>
<td>5</td>
<td>18</td>
<td>Large adults &gt;70 (†)</td>
</tr>
</tbody>
</table>

Advantages of LMA:-

It is quick, easy to insert.

It does not require muscle relaxant especially if propofol is used.

There is no increase of intraocular pressure.

No cough on emergence.

Tolerated at light planes of anaesthesia.

Avoid tracheal intubation where this might be difficult.

Less desaturation on emergence (†).
Disadvantages of LMA:-

Regurgitation of stomach content as it does not protect airway from stomach content especially patients with full stomach. However, the incidence of apparent regurgitation and aspiration is low between 0.8-2.0\% figures similar to that of face mask and endotracheal tubes\(^\text{\textsuperscript{r}}\).

Contra-indications to use of LMA:-

The patients who are not adequately fastened.

Patients who have decreased gastric motility, gastro-oesophageal reflux, hiatus hernia.

Patients with body Mass Index >\textsuperscript{r}\xi.

While the LMA has been largely evaluated with both conventional and non-conventional uses, clinical experience with the COPA is still limited. Initial reports, with its use, have demonstrated that the COPA is a convenient, safe and effective airway for spontaneously breathing anaesthetized adults, similar to LMA\(^\text{\textsuperscript{r}}\).

Cuffed oropharyngeal airway (COPA):-

The COPA is a modified Guedel airway with an extended pharyngeal section in which an inflatable cuff is embedded. Inflation
of the cuff is designed to produce an airtight seal in the oropharynx and lift the tongue. It is attached to the anaesthetic breathing system. It is designed to avoid tracheal intubation and easier to place than the LMA. The advantages and disadvantages are similar to those of LMA, although it does not form as good sealed airway as the LMA\(^{(3)}\).

**Propofol:**

Propofol without a muscle relaxant is used as an induction agent when placing extratracheal airways. Its pharmacokinetics profile most nearly meets the requirements for an ideal short acting induction agent, also due to its profound inhibitory effect on pharyngeal and laryngeal reactivity\(^{(5)}\).

**Propofol:**

\[\text{Di-isopropyl phenol}\]

\[
\text{CG(CH}_\text{γ})\text{CH(CH}_\text{γ})\text{oH}
\]

(Chemical structure of propofol)

Propofol commercially become available in \(1989\). It is insoluble in water so initially prepared by Cremphor E (BASF Aktigesellschaft) because of the anaphylactoid reaction associated with it (Cremphor
EL) the drug is reformulated in emulsion. Ampoules of the drug contain 200 mg propofol in 20 ml (10 mg/ml) and 50-100 ml bottles contain 1% (1 mg/ml) or 2% (2 mg/ml) solution are available for infusion. 

Physiochemical properties:-

Is one of group of alkyl phenols that have hypnotic properties in animals. The present formulation consist of 1% (wt/vol) propofol, 10% soya bean oil, 2,20% glycerol, 1,2% purified egg phosphatidose. It has ph. 7 and appears slightly viscous milky white substance. It is soluble at room temperature and not light sensitive. If dilute solution is required, it is compatible with 5% dextrose with water.

Pharmacology:-

Central Nervous System (CNS): Anaesthesia is induced within 2-4 seconds after intravenous administration, transfer from blood to site of action in the brain is slower than with thiopentone, loss of vertebral contact is a better end point. It reduces the duration of seizures induced ECT in human. Cerebral metabolic rate, cerebral blood flow and intracranial pressure are reduced. Regaining of
consciousness is rapid and there is minimal hangover effect in the immediate post-anaesthetic period\(^{(1)}\).

**Cardiovascular System (CVS):** Reduction of blood pressure: this usually in the induction of anaesthesia with bolus doses of propofol in unpremedicated patients, the decreased of blood pressure is more pronounced in patients premedicated with opioids and in hypertensive patients on beta adenoreceptor blockers\(^{(\text{IV}, \text{V}, \text{X})}\).

**Mechanism of hypotension:**

1. I- Peripheral vasodilatation and reduction in ventricular preload: vasodilatation appeared to be the main determinant of the propofol-induced hypotension\(^{(11)}\). (Also venodilatation may have contributed to arterial hypotension) by reducing the ventricular preload. The haemodynamic responses may be attenuated by the combination of a low bolus dose followed by an infusion of propofol\(^{(13)}\).

II- Reduction in myocardial contractility: this may also be responsible for reduction in arterial pressure, because propofol decreases beta adrenergic support\(^{(13)}\).
Bradycardia during anaesthesia with propofol: this relative bradycardia is due to increase in vagal tone and the concomitant use of narcotics and muscle relaxants in patients with normal sinus rhythm. Glycopyrrolate or atropine prevents this bradycardia\(^{(1,2)}\).

Effect on baroreflex activity: propofol depresses baroreceptor activity\(^{(1,2)}\).

**Respiratory System (RS):** apnoea is common after induction\(^{(1)}\).

Propofol has no effect on bronchial muscle tone and laryngospasm is uncommon.

Propofol suppresses laryngeal reflexes and this results in a low incidence of coughing or laryngospasm when a laryngeal mask airway is introduced\(^{(1)}\).

**Pharmacokinetics:**

After intravenous administration propofol is distributed rapidly and blood concentrations decline exponentially and metabolized in the liver (Metabolites mainly glucuronides and excreted by the kidney). Only \(\%\) of the administered dose is excreted unchanged.
The terminal elimination half life (3-8 hr).

The effective half life if (3-6 min)\(^{(c)}\).

**Dosage and administration:-**

**Adults** 1.0-2.0 mg/kg.

**Elderly** 1.20 mg/kg with subsequent addition of 1.0 mg until consciousness is lost.

**Children** 3-5.0 mg/kg\(^{(1)}\).

**Adverse effects:-**

1. Cardiovascular effect (depression) the effect is modest if the drug is given slowly or infusion.

2. Respiratory depression. Apnoea is common.

3. Excitatory phenomenon.

4. Pain on injection occurs in 5-7% of patients, it is reduced if a large vein is used, or a small dose of lignocaine 70-40 mg in 200 mg propofol, pre-injection of lignocaine 70-40± venous pressure, aspiration of blood back into propofol syringe, cooling propofol to 4-6°C, fast injection.

5. Allergic reactions\(^{(c)}\).
Indications:-

1. Induction of anaesthesia.
2. Sedation during surgery.
3. Total iv anaesthesia.
4. Sedation in intensive therapy unit.

Absolute contra-indications:-

1. Airway obstruction.
2. Known hypersensitivity to drug.
4. Children less than 3 years.

Anaesthetists have assessed both the speed and quality of recovery in comparative studies with intravenous and inhalational anaesthesia. Both direct vision laryngoscopy and tracheal intubation are known to reduce clinically relevant changes in haemodynamic variables, and a variety of pharmacological maneuvers have been investigated to reduce these undesired effects. On the contrary to LMA and COPA laryngoscopy and intubation cause an increase in heart rate, arterial pressure and dysrhythmia in up to 9.7% of patients because of stimulation of the vagus nerve and the trigeminal nerve. This was described in 1990, the response is more evident during
manipulation of the epiglottis. The systolic pressure may increased by a mean of 54 mmHg. It is usually accompanied by pulse rate changes specially sinus and even ventricular tachycardia\(^{(17)}\).

Laryngoscopy without intubation provide supraglottic pressor stimulus with significant increased in both systolic and diastolic pressure from a central level of a stable anaesthetic state, as well as increase above the pre-induction control levels. Increases in heart rate are slight and not significant from laryngoscopy alone. The act of intubation in the trachea stimulates infraglottic receptor and evokes an additional cardiovascular response with further increases in catecholamines. The pressor response increases by 32\%, heart rate increases about 40\%. Pre-treatment with fentanyl, 5 \(\mu\)g/kg or alfentanil 15 \(\mu\)g/kg, also intranasal instillation of nitroglycerin 0.6 mg in 2 mls of water, 6-8 mls of 3.3% nebulized lignocaine by inhalational 3 minutes before laryngoscopy reduces harmful cardiovascular effects of intubation\(^{(13)}\).

Stoelting RK studied the circulatory response to laryngoscopy and tracheal intubation with or without oropharyngeal viscous lidocaine 20 mls of 2% as a mouth wash and gargle 10 minutes before laryngoscopy attenuated the pressor effect but not the heart rate
during laryngoscopy and tracheal intubation, mean arterial pressure increase less in response to tracheal intubation and return toward awake levels sooner in patients receiving viscous lidocaine\(^{(1)}\).

In a study by Braude N, it demonstrated that the insertion of an extra-tracheal airway, like the laryngeal mask, is associated with an increased in mean arterial blood pressure. This revealed that the use of laryngeal mask offer some advantages over tracheal intubation in the management of patients where the avoidance of pressor response is of particular concern\(^{(1)}\).

In a study by Brimacombe et al in a comparison of the laryngeal mask airway and cuffed oropharyngeal airway in anaesthetized adult patient, it did not report a significant difference in the haemodynamic changes observed after COPA or LMA placement\(^{(1)}\).

A prospective randomized study conducted by Casati to examine the pressor response associated with either COPA or LMA insertion, all patients were pred-medicated with intravenous midazolam (\(\cdot\cdot\cdot\cdot\cdot\ mg/kg\) \(\cdot\cdot\) minutes before operation, baseline blood pressure and pulse taken, then it is recorded each minute for the subsequent \(\cdot\cdot\) minutes after the designed extra-tracheal airway was inserted, the result showed that no differences in anthropometric
variables and baseline haemodynamics values were observed between the two groups. A slight increase in heart rate and mean arterial blood pressure was observed after airway placement in each group; however, no differences were observed between the two airways\(^1\).

In a study by Barker P on movements of the vocal cords on induction of anaesthesia with thiopentone or propofol using a fibrooptic laryngoscope, recorded on video tape, it was recorded that the angle formed by the vocal cord decreased after induction of anaesthesia in both groups. This reduction of angle was significantly greater with thiopentone group. This difference may be explained by greater depression of laryngeal reflexes by propofol and this may account for the lower incidence of laryngospasm after induction of anaesthesia with propofol in comparison with thiopentone\(^2\).

In another study by Brown GW comparing propofol and thiopentone for laryngeal mask insertion, there was greater incidence of gagging following induction with thiopentone.

Propofol is more frequently used to induce anaesthesia when inserting extratreacheal airways and target-controlled infusion (TCI) system have become recently available to physicians\(^1\).
A study by Andrea Casati tried to determine the target plasma concentration of propofol required to place either LMA or COPA, it was found that the target plasma concentration of propofol had to be increased up to \(4 \mu g/ml\) in COPA group and \(6 \mu g/ml\) in LMA group, which demonstrates that placing the LMA requires target plasma concentration higher than those required by placing a COPA\(^{(1)}\).

Nakata et al evaluated the use of inhalational anaesthesia to place LMA and COPA. In particular to determine the anaesthetic duration required to achieve good condition for COPA or LMA placement when administering only \(5\%\) sevoflurane via face mask. The placement of COPA and LMA achieved in \(0.1\) and \(0.6\) seconds, respectively, which suggests that COPA could be less stimulating than LMA placement. A reasonable explanation could be that COPA stays in the oropharynx while LMA reaches the larynx\(^{(2)}\).

In a survey of laryngeal mask airway usage safety and efficacy for conventional and non-conventional usage by Verghese C concluded that LMA technique is safe and effective for both spontaneous and controlled ventilation, and that the use of LMA for gynaecological laparoscopy, gynaecologic laparotomy and procedure > 2 hours also appear safe\(^{(3)}\).
The advantages of LMA over tracheal tube or face mask study by Brimacombe J concluded that advantages over endotracheal tube included:-

- Increased speed and ease of placement by inexperienced personnel.
- Increased speed of placement by anaesthetists.
- Improved haemodynamic stability at induction and during emergence.
- Minimal increase in intraocular pressure following insertion.
- Reduced anaesthetic requirements for airway tolerance.
- Lower frequency of coughing during emergence.
- Improved oxygen saturation during emergence.
- Lower incidence of sore throat in adults.

**Advantages over face mask (FM):**-

- Easier placement by inexperienced personnel.
- Improved oxygen saturation.
- Less hand fatigue.
- Improved operating conditions during minor paediatric surgery.
Disadvantages over ETT were lower seal pressures and higher frequency of gastric insufflation. The only disadvantage compared with the face mask was that oesophageal reflux was more likely\(^{(7)}\).

A comparison of the laryngeal mask airway and cuffed oropharyngeal airway in anaesthetized adult patient:-

The placement success rate.

Airway interventional requirements.

Intra- and post-operative adverse events.

In a study done by Brimacombe et al and Greensberg et al demonstrated that the COPA provided a lower first time success rate, and require more frequent airway manipulations than did the LMA\(^{(7)}\).

Interestingly, while Greensberg et al reported more frequent hiccups, blood on the device and sore throat after LMA than COPA, Brimacombe et al observed more frequent blood on the device, sore throat on the COPA than LMA patients\(^{(1)}\).

However, after data of the two studies are pooled together, the incidence of hiccuppings and blood detection on device was higher in LMA patients than the COPA ones, while sore throat was more frequent after LMA placement, only in the immediate post-operative period. These two studies demonstrated that when used in healthy
adult patients undergoing spontaneously breathing, general anaesthesia for routine minor procedures, the COPA and LMA are equivalent in providing a safe and effective airway management\(^{(1)}\).

The LMA associated with higher first-time placement rate and fewer manipulation during usage, while the COPA associated with lower incidence of sore throat in the immediate post-operative period, due to less pharyngeal trauma as suggested by the lower incidence of blood detection after removal.

An Italian experience with cuffed oropharyngeal airway, a prospective observational study by Fauelli G concluded that COPA provided a safe and effective airway management in mechanically ventilated patients breathing as that observed during spontaneous breathing. Experience with the COPA had no effects on the placement success rate or incidence of utoward event\(^{(10)}\).
METHODOLOGY

1. Period and size of the study:-

This study was carried out on randomized selected patients scheduled for minor elective surgery at Khartoum Teaching Hospital, and Soba University Hospital during the period from March to October, ٢٠٠٢.

2. Study population:-

Eighty patients of ASA grade I undergoing general anaesthesia using extra-tracheal airways, spontaneously breathing:-

a. Laryngeal mask airway

b. Cuffed oropharyngeal airway

3. Study design:-

This study is a prospective study evaluating the use of extra-tracheal airway in minor surgical operations of short duration in spontaneously breathing anaesthetized patients.

4. Study view:-

A patient data form was filled for each patient separately. This included name, age, weight, type of operation, baseline blood pressure and pulse, drug and dose, type of ETA.
Intra-operative chart of heart rate and blood pressure for ١٠ minutes after insertion of the device. ECG monitor and pulse oximeter for arterial oxygen saturation.

Complications intra-operative (major and minor)

Complications immediate post-operative.

Complications ٤٢ hours post-operative.

Time of removal and duration of surgery.

The patients are induced by atropine ١ mg, propofol ٥٫٣-٣ mg/kg. Intravenous injection of the drug stopped when patient lost verbal contact. After adequate jaw relaxation had been observed, airway manipulation such as head tilt, chin lift and jaw thrust was done, the extra-tracheal airway inserted and fixed, oxygen ٣٠% and nitrous oxide ٧٠%, halothane for maintenance ٨-٧,٣% and the patient allowed to breathe spontaneously.

Recovery:

Halothane is stopped together with nitrous oxide, oxygen ٠٠% is administered, extra-tracheal airways removed when the patient is awake, allowed to breathe through face mask and transferred to recovery room.
Data processing:-

Data was analyzed using SPSS (Statistical Package for Social Sciences) T-test was used for comparison of means of quantative variables at ۹۰٪ confidence level (P=۰.۰۰) and Levene’s test for equality of variables.
RESULTS

Eighty patients undergoing elective minor surgery at Khartoum Teaching Hospital and Soba University Hospital were studied.

Table (1):

Mean age group in (yrs) was (3.4 ± 3).

Mean weight in (kg) was (6.8 ± 7).

Mean duration of surgery in (min) was (6 ± 2).

Table (2):

Showed the haemodynamic differences between COPA and LMA in the first 10 minutes after insertion.

In figure (1), type of minor surgery procedures were thirty four percent (34%), anorectal surgery, sixteen (16%) urology, ten (10%) madura, twelve (12%) breast conditions and twenty-eight (28%) other minor types of surgery such as excisional biopsy, debridment, examination under GA.

Adverse peri-operative complications concerning the two extra-tracheal airways were recorded. Concerning major intra-operative complications (figure 2) for (OPA) (4%, 6%) regurgitation, two (2%) had laryngeal spasm while seven (7%) had transient hypoxia.
In figure (٣), minor intra-operative complication for (COPA), two (٢٪) had hiccupping, five (٥٪) coughing, ten (١٠٪) had blood detected on device.

Regarding LMA major intra-operative complications (figure ٣) (٤٪) had regurgitation, one (١٪) laryngeal spasm and three (٣٪) transient hypoxia.

In figure (٣), minor intra-operative complications of this group were four (٤٪) had hiccupping, two (٢٪) cough and five (٥٪) blood detected on the device.

In the group of (COPA) (figure ٤), immediate post-operative period, two (٢٪) had mouth trauma while three (٣٪) sore throat. Twenty-four hours post-operative (figure ٥) nineteen (٩١٪) patients got sore throat, eight (٨٪) mouth trauma and twenty (٠٢٪) neck ache.

In the group of (LMA) immediate post-operative complications (figure ٤) were one (١٪) had mouth trauma, three (٣٪) sore throat. But twenty-four hours post-operative (figure ٥) twelve (١١٪) had sore throat and five (٥٪) mouth trauma, while only two (٢٪) neck ache.
Table (1): Mean characteristics of patients

Undergoing minor surgical operations

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mean</th>
</tr>
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<tr>
<td>Age (years)</td>
<td>34.3</td>
</tr>
<tr>
<td>Weight (Kgs)</td>
<td>68.6</td>
</tr>
<tr>
<td>Duration of surgery (min)</td>
<td>67.6</td>
</tr>
</tbody>
</table>

Table (2): Mean haemodynamic difference
between LMA & COPA

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Pulse</th>
<th>Arterial pressure</th>
<th>Time (min)</th>
<th>Pulse/min</th>
<th>MAP/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>72</td>
<td>80</td>
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DISCUSSION
The use of extra-tracheal airways was very beneficial in anaesthesia as they can obviate the need of face mask and tracheal intubation.

The laryngeal mask was designed as a new concept in airway management and has been gaining a firm position in anaesthetic practice. Despite widespread use especially after failed tracheal intubation numerous articles have been written but few large controlled trials have been done. The cuffed oropharyngeal airway is a new device that is similar to laryngeal mask in many ways. This study assessed the efficacy and safety of the devices, compared complications associated with insertion, also the physiological effects of the devices including changes in blood pressure and heart rate.

Table (1) showed mean age, weight, duration of minor surgical operation but was insignificant.

A slight increase in heart rate and blood pressure after airway placement in each group is recorded but the haemodynamics changes of the two devices (table 2) showed no significant differences between them (P>0.05). This was also concluded in a similar study by Brimacombe et al who did not report a significant
difference in the haemodynamic changes observed after COPA or LMA placement. Concerning adverse events major intra-operative (figure 2) during insertion revealed equal incidence of regurgitation in COPA and LMA, but a higher incidence of laryngeal spasm and transient hypoxia with COPA than LMA may be due to inexperienced placement, but the difference was insignificant (P>0.05). Greensberg et al study showed that there is a higher incidence of regurgitation, laryngeal spasm and hypoxia with COPA than LMA.

Minor intra-operative complications (figure 3) showed more incidence of hiccups with LMA, but more frequent cough and blood detected after COPA than LMA due to several trials for successful placement, but this was insignificant (P>0.05).

On immediate post-operative period (figure 4), mouth trauma and sore throat were frequent with COPA than LMA but the difference was insignificant (P>0.05).

Twenty-four hours post-operative (figure 5) there is increased incidence of sore throat, mouth trauma and neck ache with COPA than LMA. Interestingly while Greensberg et al reported more frequent hiccups, blood on the device and sore throat after LMA
than COPA, Brimicombe et al observed more frequent blood on the device, sore throat and neck ache on COPA.

Thus the study demonstrated that when used in healthy adult patients undergoing spontaneously breathing, general anaesthesia for routine minor procedures, the COPA and LMA are substantially equivalent in providing a safe and effective airway management.
CONCLUSION

While a large number of clinical trials have evaluated the efficacy and safety of the LMA in a wide range of clinical situations, the literature about COPA use is still limited. This study concluded that the cuffed oropharyngeal airway needs less drug requirement than the laryngeal mask airway for successful placement, there is more laryngeal spasm, transient hypoxia in COPA than laryngeal mask during insertion. Also associated with more cough, sore throat, mouth trauma, neck ache in the post-operative period, but the difference of incidences was insignificant. Both extra-tracheal airways were associated with insignificant haemodynamic changes.

Lastly, both COPA and LMA are equally safe and efficient in the management of spontaneously breathing anaesthetized patients.
RECOMMENDATIONS

1. To replace face mask by the cuffed oropharyngael airway in elective short surgical procedures due to less hand fatigue and easier placement by inexperienced personnel.

2. Availability of the cuffed oropharyngeal airway in the hospitals.

3. Training the anaesthetic staff (doctors, assistants) to the use of extra-tracheal airways (COPA), so as to perform other tasks such as monitoring, drug administration and in cases of difficult intubation.

4. More extensive clinical evaluation should be advocated to better understand the risk/benefit ratio of this new extra-tracheal airway device.
REFERENCES


5. Diprivan versatil intravenous anaesthesia technical monograph; 1979/Jan 1994; 137: 60-68.


Fig. 5: 24 hours postoperative complications

- Sore throat: 19% (COPA) vs. 12% (LMA)
- Mouth trauma: 8% (COPA) vs. 5% (LMA)
- Neckache: 20% (COPA) vs. 2% (LMA)