AIM OF THE WORK

The aim of this work was to compare the efficacy of application of benzydamine hydrochloride gel 5%, lignocaine gel 5% on the endotracheal tube cuff and inhaled 500 mcg of fluticasone propionate for prevention of the postoperative sore throat and upper airway obstruction.

PATIENTS AND METHODS

Patients

After approval of Local Ethics Committee and with written informed consent from patients, the present study was carried out in Alexandria Main University Hospitals on one hundred and fifty patients. The patients aged between 30-40 years old, ASA physical status I and II, of both sexes, scheduled for elective surgery with general anaesthesia and endotracheal intubation in the supine position. The sample size and the number of the study groups were determined after the recommendations of the Biostatistics department of the High Institute of Public Health, Alexandria University.

Exclusion criteria

1. Allergy to the used drugs.
2. Current upper or lower respiratory tract disease symptoms or smokers.
3. Patients who were difficult to communicate with.
4. Patients with first attempt failed laryngoscopy.
5. Patients with postoperative intubation or reintubation or nasogastric tube insertion.
6. Recent intake of anti-inflammatory drugs.

Methods

Preoperative evaluation, preparation and premedication:

Evaluation of the patients was carried out through:

1. Proper history taking and clinical examination, to exclude cardiovascular, respiratory, neuromuscular, pschycological, metabolic diseases or communication problems.
2. Routine laboratory investigations.
3. Airway assessment: including: Mallampati classification, thyro-mental distance and mouth opening.

Anaesthetic technique

- No premedication was given.
- Each patient was attached to a multi-channel monitor (Trakmon Kontron limited, England) to display:

  - Continuous ECG monitoring for detection of dysrhythmias (lead II, V5).
  - Heart rate (beats /min).
  - Non-invasive arterial blood pressure monitoring: mean arterial blood pressure (MAP), systolic arterial blood pressure (SAP) and diastolic arterial blood pressure (DAP).
  - Arterial oxygen saturation (S_pO_2).
- A 20 gauge cannula was inserted and NaCl 0.9% intravenous infusion was started.
- Pre-oxygenation via facemask was carried out for 3-5 min.
- Induction of anaesthesia was carried out with intravenous fentanyl 1 microgram/kg, intravenous Propofol (2mg/kg).
- Intravenous Administration of 1 mg/kg rocuronium was done.
- Patients were divided randomly using closed envelopes into 3 equal groups:

Group I: Was intubated after application of 4 ml of benzydamine hydrochloride gel 5% on the endotracheal tube cuff used.

Group II: Was intubated after application of 4 ml of lignocaine gel 5% on the endotracheal tube cuff used.

Group III: Was intubated after inhalation of 500 mcg of fluticasone before induction of general anaesthesia and application of 4 ml of plain (K-Y) gel on the endotracheal tube cuff used.

- Endotracheal intubation was done by an anaesthetist with a minimum of two years experience.
- Endotracheal tube cuff was inflated with minimal volume of air in order to prevent audible or palpable leak at 20 CmH_2O pressure.
- Patients were put on mechanical ventilation tidal volume 7ml/kg, rate 12 breath/minute, PEEP 3 CmH_2O and FIO_2 100%.
- Anaesthesia was maintained with isoflurane 1.2%, rocuronium 0.25mg/kg/40 minutes or as needed clinically.
- At the end of the operation the muscle relaxant was antagonized by use of 0.015 mg/kg atropine and 0.07 mg/kg neostigmine intravenously and isoflurane was discontinued.

- After return of consciousness and full muscle power the extubation was done (with no touch technique) which means: Secretions were carefully suctioned from the pharynx under direct visualization, the endotracheal tube cuff was deflated, and then the patient was turned to the lateral (recovery) position while adequately anaesthetized. After being placed in the recovery position volatile anaesthetic was discontinued, and no further physical stimulation was allowed until patients spontaneously waked up.[43]
- Patients were monitored carefully clinically and haemodynamically.

Measurements

The following parameters were measured:

A. Haemodynamic measurement

- Heart rate (beats per minute), mean arterial blood pressure (MAP): measured in mm Hg, and arterial oxygen saturation (S_pO_2): using pulse oximeter .

B. A four point scale for assessment of presence and severity of postextubation upper airway obstruction :[43]

Patients were investigated and observed by a single investigator who was blinded to the group allocation.

Variable	Immediately post extubation	One hour post extubation	6 hours post extubation
No sensation of upper airway obstruction	0	0	0
Stridor on inspiration	1	1	1
Total vocal cords occlusion or silent chest	2	2	2
Cyanosis	3	3	3

C. A four point scale for assessment of presence and severity of postoperative sore throat :[62]

Patients were asked by a single investigator who was blinded to the group allocation.

Variable	1hour post extubation	6 hours post extubation	12 hours post extubation	24 hours post extubation
No sore throat	0	0	0	0
Mild sore throat (complains of sore throat only on asking)	1	1	1	1
Moderate (complains of sore throat on his or her own) sore throat	2	2	2	2
Severe sore throat (change of voice or hoarseness associated with throat pain)	3	3	3	3

Statistical analysis of the data [69,70]

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. Qualitative data were described using number and percent. Quantitative data were described using range (minimum and maximum), mean, standard deviation and median. Comparison between different groups regarding categorical variables was tested using Chi-square test. When more than 20% of the cells have expected count less than 5, correction for chi-square was conducted using Fisher's Exact test or Monte Carlo correction. The distributions of quantitative variables were tested for normality using Kolmogorov-Smirnov test, Shapiro-Wilk test and D'Agstino test, also Histogram and QQ plot were used for vision test. If it reveals normal data distribution, parametric tests were applied. If the data were abnormally distributed, non-parametric tests were used. For normally distributed data, comparison between the three studied groups was done using F-test (ANOVA) and Post Hoc test (Scheffe), also paired t-test was used to analyze two paired data, comparison between different periods was done using ANOVA with repeated measures and Post Hoc test was assessed using Bonferroni adjusted. For abnormally distributed data, comparison between the three studied groups was done using Kruskal Wallis test and pair wise comparison was assessed using Mann-Whitney test. To compare between the different periods Wilcoxon signed ranks test was assesed. Significance of the obtained results was judged at the 5% level.

RESULTS

Sex

There was no significant difference in subjects' sex between the three studied groups.

Table (I): Comparison between the three studied groups according to sex

	Benzydamine	Lignocaine	Fluticasone
Male	25 (50.0%)	26 (52.0%)	27 (54.0%)
Female	25 (50.0%)	24 (48.0%)	23 (46.0%)
χ^2(p)	0.160 (0.923)		
p_1	0.841		
p_2	0.689		
p_3	0.841		

χ^2: Chi square test.
p : p value for Chi square test for comparing between the three studied groups.
p_1 : p value for Chi square test for comparing between benzydamine and lignocaine.
p_2 : p value for Chi square test for comparing between benzydamine and fluticasone.
p_3 : p value for Chi square test for comparing between lignocaine and fluticasone.

Age

The mean age was 33.98 ± 3.03 years in group I (the benzydamine group), 33.98 ± 3.11 in group II (the lignocaine group) and 33.30 ± 3.01 in group III (the fluticasone group), with no significant difference in subjects' age between the three studied groups.

Table (II): Comparison between the three studied groups according to age (years)

	Benzydamine	Lignocaine	Fluticasone
Min.	30.0	30.0	30.0
Max.	40.0	40.0	40.0
Mean	33.98	33.98	33.30
SD	3.03	3.11	3.01
F(p)	0.828 (0.439)		
p_1	1.000		
p_2	0.539		
p_3	0.539		

F: F test (ANOVA).
p : p value for comparing between the three studied groups.
p_1 : p value for Post Hoc test (Scheffe) for comparing between benzydamine and lignocaine.
p_2 : p value for Post Hoc test (Scheffe) for comparing between benzydamine and fluticasone.
p_3 : p value for Post Hoc test (Scheffe) for comparing between lignocaine and fluticasone.

Vital signs

Heart rate

Changes in the heart rate showed significant decrease in the post-induction measurements compared to the pre-induction measurements, p (≤ 0.05), in group II (the lignocaine group). The mean post-induction heart rate was 68.38 ±8.28 compared to 77.12 ± 12.18 pre-induction.

The two other groups showed no significant difference between the pre-induction and the post-induction heart rate measurements.

Table (III): Distribution of the studied cases according to Heart rate (HR) in benzydamine group

	HR	
	Pre-induction	**Post-induction**
Min.	62.0	62.0
Max.	104.0	104.0
Mean	79.58	79.14
SD	11.27	11.22
t(p)	1.417 (0.163)	

t: Paired t-test.
*: Statistically significant at P ≤ 0.05.

Table (IV): Distribution of the studied cases according to Heart rate (HR) in lignocaine group

	HR	
	Pre-induction	**Post-induction**
Min.	59.0	54.0
Max.	105.0	85.0
Mean	77.12	68.38
SD	12.18	8.28
t(p)	9.579* (<0.001*)	

t: Paired t-test.
*: Statistically significant at P ≤ 0.05.

Table (V): Distribution of the studied cases according to Heart rate (HR) in fluticasone group

	HR	
	Pre-induction	**Post-induction**
Min.	59.0	54.0
Max.	103.0	98.0
Mean	78.26	77.18
SD	11.08	11.22
t(p)	2.001 (0.051)	

t: Paired t-test.
*: Statistically significant at P ≤ 0.05.

Comparison between the three studied groups showed significant differences between group II (the lignocaine group) and the two other groups with the least post-induction heart rate measurements in the lignocaine group patients.

Table (VI): Comparison between the three studied groups according to heart rate (HR)

	Pre-induction	Post-induction
Benzydamine group		
Min.	62.0	62.0
Max.	104.0	104.0
Mean	79.58	79.14
SD	11.27	11.22
Lignocaine group		
Min.	59.0	54.0
Max.	105.0	85.0
Mean	77.12	68.38
SD	12.18	8.28
Fluticasone group		
Min.	59.0	54.0
Max.	103.0	98.0
Mean	78.26	77.18
SD	11.08	11.22
F(p)	0.571 (0.566)	15.386* (<0.001*)
p_1	0.567	<0.001*
p_2	0.849	0.639
p_3	0.885	<0.001*

F: F test (ANOVA).
p : p value for comparing between the three studied groups.
p_1 : p value for Post Hoc test (Scheffe) for comparing between benzydamine and lignocaine.
p_2 : p value for Post Hoc test (Scheffe) for comparing between benzydamine and fluticasone.
p_3 : p value for Post Hoc test (Scheffe) for comparing between lignocaine and fluticasone.
*: Statistically significant at $p \leq 0.05$.

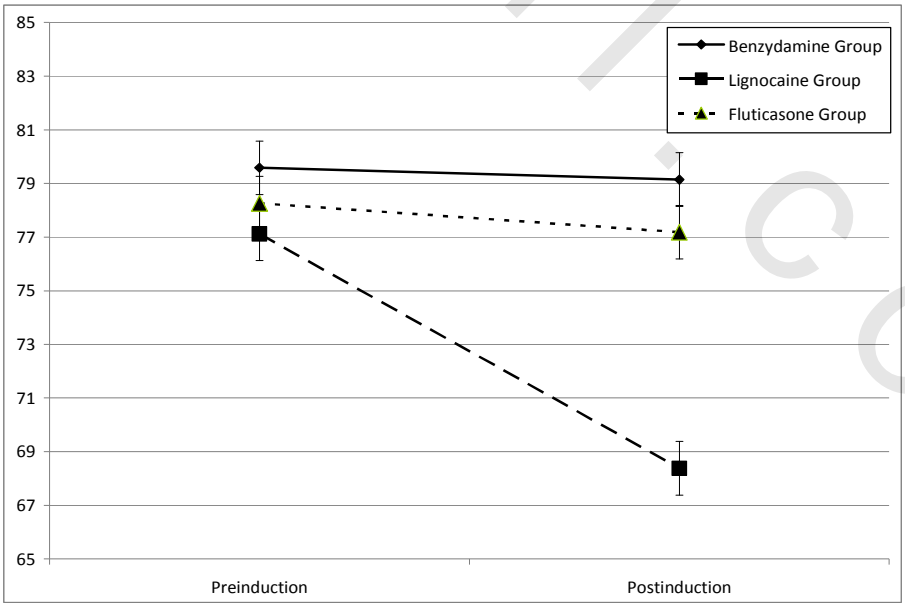

Figure (4): Comparison between the three studied groups according to heart rate.

Mean arterial blood pressure (mm Hg)

Changes in the mean arterial blood pressure showed significant difference in the post-induction measurements compared to the pre-induction values, p (≤ 0.05), in group II (lignocaine group). The mean post-induction arterial blood pressure was 71.56 ± 12.11 compared to 78.68 ± 12.78 pre-induction.

The two other groups showed no significant difference between the pre-induction and the post-induction mean arterial blood pressure values.

Table (VII): Distribution of the studied cases according to mean arterial blood pressure in benzydamine group

	Mean arterial blood pressure	
	Pre-induction	**Post-induction**
Min.	60.0	60.0
Max	106.0	106.0
Mean	82.70	82.16
SD	13.63	13.50
t(p)	1.676 (0.100)	

t: Paired t-test.
*: Statistically significant at p ≤ 0.05.

Table (VIII): Distribution of the studied cases according to mean arterial blood pressure in lignocaine group

	Mean arterial blood pressure	
	Pre-induction	**Post-induction**
Min.	62.0	58.0
Max	104.0	99.0
Mean	78.68	71.56
SD	12.78	12.11
t(p)	13.895* (<0.001*)	

t: Paired t-test.
*: Statistically significant at p ≤ 0.05.

Table (IX): Distribution of the studied cases according to mean arterial blood pressure in fluticasone group

	Mean arterial blood pressure	
	Pre-induction	**Post-induction**
Min.	63.0	59.0
Max	106.0	102.0
Mean	84.10	83.18
SD	12.98	11.97
t(p)	1.456 (0.152)	

t: Paired t-test.
*: Statistically significant at p ≤ 0.05.

Comparison between the three studied groups showed significant differences between the lignocaine group and the two other groups with the least post-induction mean arterial blood pressure measurements in the lignocaine group patients.

Table (X): Comparison between the three studied groups according to mean arterial blood pressure

	Pre-induction	Post-induction
Benzydamine group		
Min.	60.0	60.0
Max	106.0	106.0
Mean	82.70	82.16
SD	13.63	13.50
Lignocaine group		
Min.	62.0	58.0
Max	104.0	99.0
Mean	78.68	71.56
SD	12.78	12.11
Fluticasone group		
Min.	63.0	59.0
Max	106.0	102.0
Mean	84.10	83.18
SD	12.98	11.97
F(p)	2.294 (0.104)	13.151* (<0.001*)
p_1	0.313	<0.001*
p_2	0.868	0.921
p_3	0.123	<0.001*

F: F test (ANOVA).
p : p value for comparing between the three studied groups.
p_1 : p value for Post Hoc test (Scheffe) for comparing between benzydamine and lignocaine.
p_2 : p value for Post Hoc test (Scheffe) for comparing between benzydamine and fluticasone.
p_3 : p value for Post Hoc test (Scheffe) for comparing between lignocaine and fluticasone.
*: Statistically significant at $p \leq 0.05$.

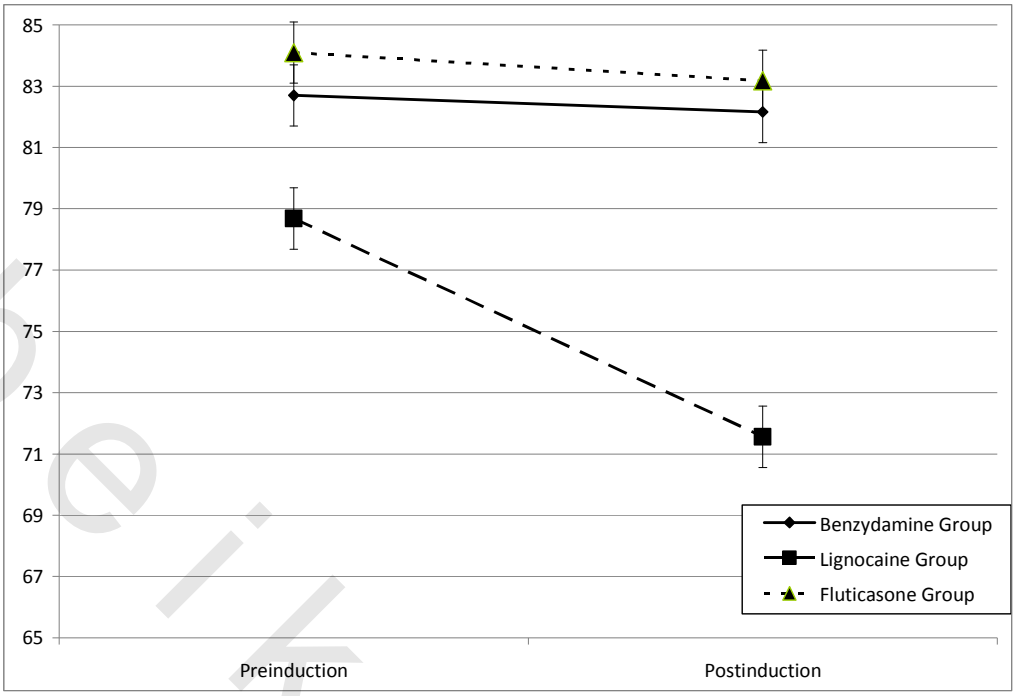

Figure (5): Comparison between the three studied groups according to mean arterial blood pressure.

Pulse oximetric oxygen saturation (S_pO_2) %

Comparison between the three studied groups showed differences of statistical significance, p (≤ 0.05), in the post-induction measurements between groups I and II, and between groups II and III. In group I the mean post-induction S_pO_2 was 98.9±0.84, in group II the mean post-induction S_pO_2 was 97.94±1.08, and in group III the mean post-induction S_pO_2 was 99.14±0.86.

Also there were differences of statistical significance, p (≤ 0.05), in the values measured postextubation between the three studied groups, in group I the mean postextubation S_pO_2 was 97.6 ± 1.31, in group II the mean postextubation S_pO_2 was 98.24 ±1.13, and in group III the mean post-induction S_pO_2 was 98.86±1.12.

S_pO_2 was never recorded to be below the critical point (94%) in any of the three studied groups at any period.

Table (XI): Comparison between the three studied groups according to pulse oximeter O_2 saturation (S_pO_2)

	Pre-induction	Post-Induction	After surgical stimulus	5 min	10 min	15 min	20 min	25 min	30 min	End operation	Post-extuba-tion.
Benzydamine group											
Min.	97	97	97	97	97	97	97	97	97	97	94
Max.	100	100	100	100	100	100	100	100	100	100.0	100
Mean	98.7	98.9	98.6	98.8	98.6	98.7	98.8	98.7	98.7	98.7	97.6
SD	1.0	0.84	0.92	0.90	0.86	0.88	0.90	0.91	0.84	0.92	1.31
Lignocaine group											
Min.	97.0	96.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	95.0
Max.	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean	98.76	97.94	98.76	98.80	98.74	98.82	98.76	98.76	98.58	98.70	98.24
SD	1.08	1.08	1.04	1.05	0.92	0.92	0.92	1.04	1.01	1.05	1.13
Fluticasone group											
Min.	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	96.0
Max.	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean	98.62	99.14	99.06	98.76	98.72	98.78	98.90	98.70	98.70	98.78	98.86
SD	1.01	0.86	0.91	0.87	0.88	0.97	0.93	0.97	0.81	0.79	1.12
F	0.359	23.272*	2.356	0.053	0.364	0.148	0.295	0.091	0.635	0.101	14.526*
P	0.699	<0.001*	0.098	0.949	0.695	0.863	0.745	0.913	0.531	0.904	<0.001*
p_1	0.995	<0.001*	0.873	0.994	0.733	0.864	0.948	0.995	0.536	0.949	0.023*
p_2	0.739	0.438	0.117	0.951	0.796	0.949	0.909	0.920	0.905	0.994	<0.001*
p_3	0.794	<0.001*	0.297	0.978	0.994	0.977	0.747	0.954	0.798	0.911	0.036*

F: F test (ANOVA).
p : p value for comparing between the three studied groups.
p_1 : p value for Post Hoc test (Scheffe) for comparing between benzydamine and lignocaine.
p_2 : p value for Post Hoc test (Scheffe) for comparing between benzydamine and fluticasone.
p_3 : p value for Post Hoc test (Scheffe) for comparing between lignocaine and fluticasone.
*: Statistically significant at $p \leq 0.05$.

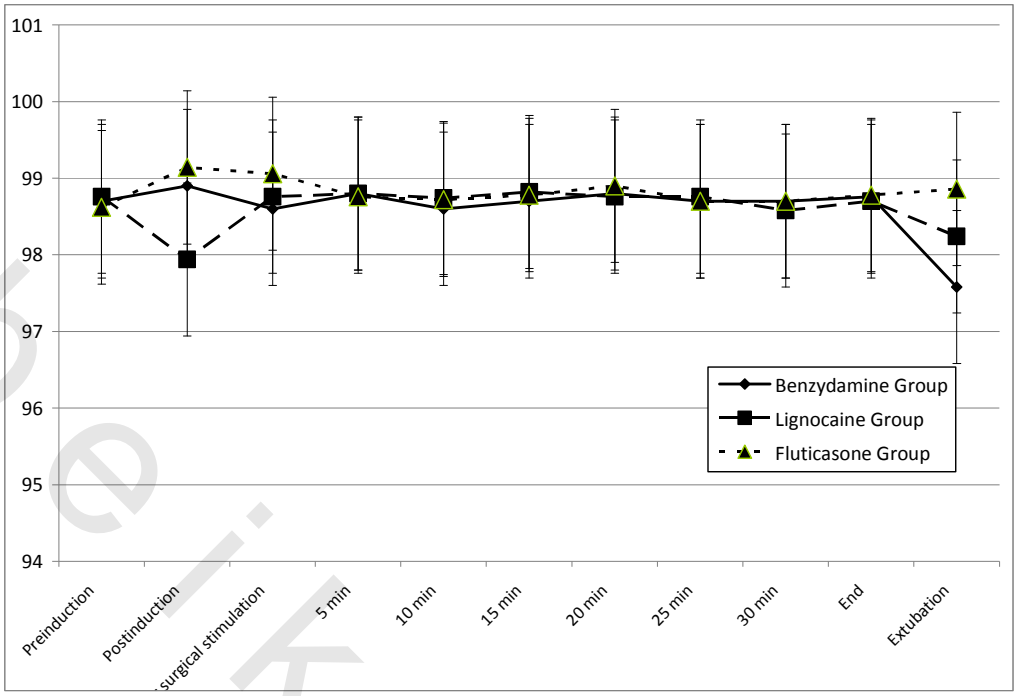

Figure (6): Comparison between the three studied groups according to pulse oximetric O_2 saturation (S_pO_2).

Upper airway obstruction UAO score

Changes in the observed UAO score showed significant decrease in the incidence of UAO one hour and six hours postextubation compared to its incidence immediately postextubation, p (≤ 0.05), in the three studied groups patients.

In the benzydamine group, 20% of patients had an UAO score of 1 immediately postextubation compared to 10% of patients one hour post-extubation and 6% of patients 6 hours postextubation. 4% of patients had an UAO score of 2 immediately postextubation, with no observed incidence of UAO score of 2 one hour or 6 hours postextubation.

Table (XII): Distribution of the studied cases according to four point score for upper airway obstruction (UAO) in benzydamine group

UAO score	UAO		
	Immediately	1 hour	6 hours
0	38 (76.0%)	45 (90.0%)	47 (94.0%)
1	10 (20.0%)	5 (10.0%)	3 (6.0%)
2	2 (4.0%)	0 (0.0%)	0 (0.0%)
p		0.029*	0.005*

p: p value for Wilcoxon signed ranks test for comparing between immediately with 1 and 6 hours.
*: Statistically significant at $p \leq 0.05$.

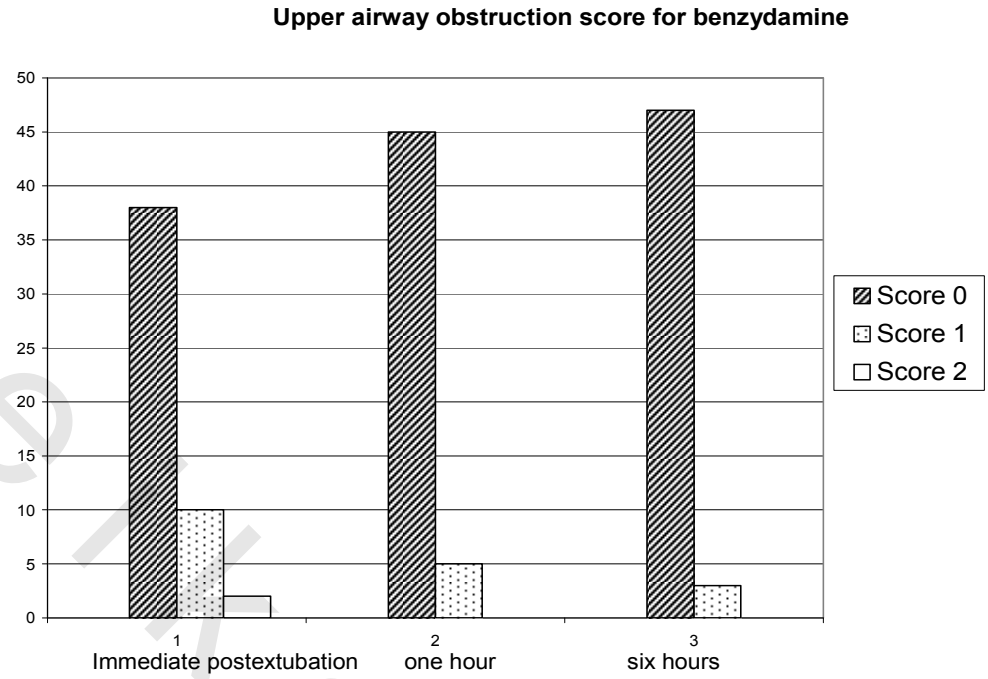

Figure (7): Upper airway obstruction score for benzydamine.

In the lignocaine group 42% of patients had an UAO score of 1 immediately postextubation compared to 28% of patients one hour and 14% of patients six hours postextubation and UAO score of 2 was observed only in the immediate postextubation period with an incidence of 8% of patients.

Table (XIII): Distribution of the studied cases according to four point score for upper airway obstruction (UAO) in lignocaine group

UAO score	UAO		
	Immediately	**1 hour**	**6 hours**
0	25 (50.0%)	36 (72.0 %)	43 (86.0%)
1	21 (42.0%)	14 (28.0%)	7 (14.0%)
2	4 (8.0%)	0 (0.0%)	0(0.0%)
p		0.002*	<0.001*

p: p value for Wilcoxon signed ranks test for comparing between immediately with 1 and 6 hours.
*: Statistically significant at $p \leq 0.05$.

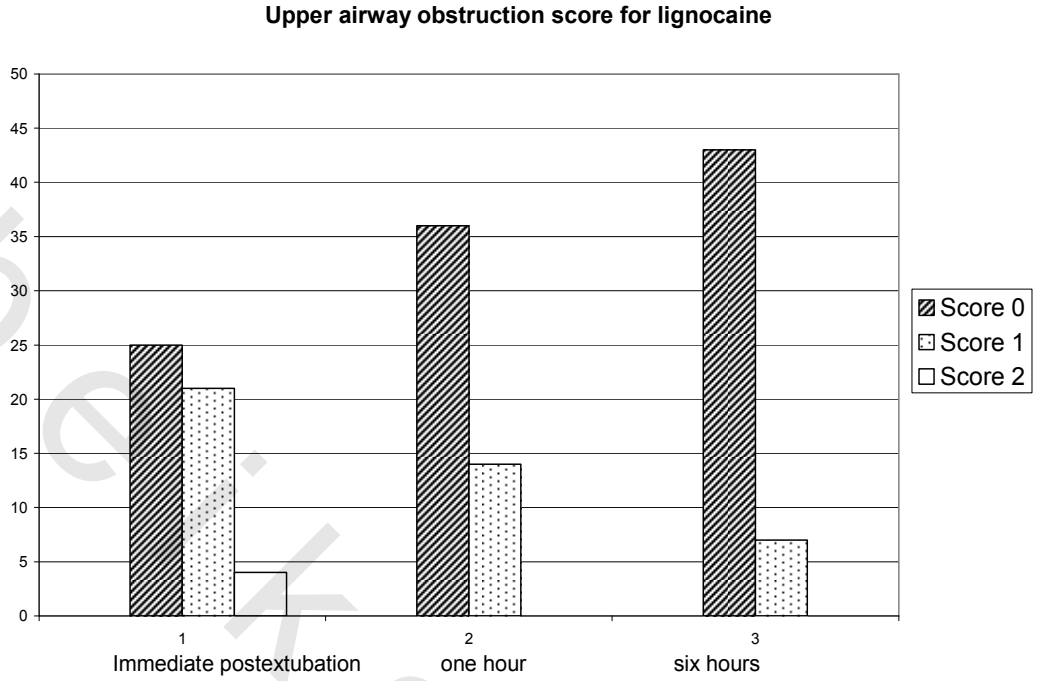

Figure (8): Upper airway obstruction score for lignocaine.

In the fluticasone group 18% of patients had an UAO score of 1 immediately postextubation compared to 6% of patients one hour post-extubation and 4% of patients six hours postextubation.

There was no observed incidence of UAO of score 2 in the fluticasone group patients at any period.

Table (XIV): Distribution of the studied cases according to four point score for upper airway obstruction (UAO) in fluticasone group

UAO score	UAO		
	Immediately	**1 hour**	**6 hours**
0	41 (82.0%)	47 (94.0%)	48 (96.0%)
1	9 (18.0%)	3 (6.0%)	2 (4.0%)
2	0 (0.0%)	0 (0.0%)	0.0 (0.0%)
p		0.034*	0.008*

p: p value for Wilcoxon signed ranks test for comparing between immediately with 1 and 6 hours.
*: Statistically significant at $p \leq 0.05$.

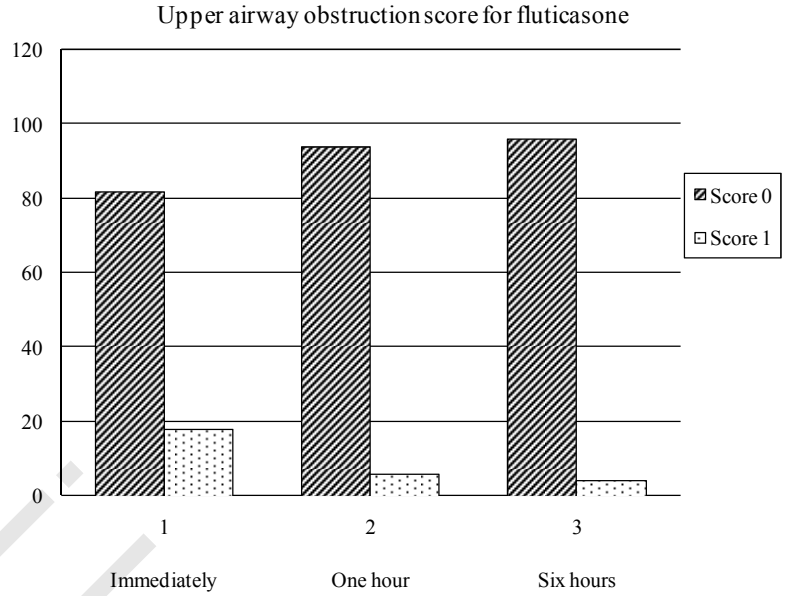

Figure (9): Upper airway obstruction score for fluticasone.

Comparison between the three studied groups showed significant differences in the UAO incidence observed immediately and one hour post-extubation, p ($\leq$ 0.05), between groups I and II, and between groups II and III with the most observed incidence of UAO in group II (lignocaine group) patients, there was no significant difference in the observed UAO incidence between groups I (benzydamine group) patients and III (fluticasone group) patients at any period.

There was no observed incidence of UAO score of 3 (cyanosis) in any of the three groups at any period.

Table (XV): Comparison between the three studied groups according to four point score for upper airway obstruction (UAO)

UAO score	UAO		
	Immediately	**1 hour**	**6 hours**
Benzydamine group			
0	38 (76.0%)	45 (90.0%)	47 (94.0%)
1	10 (20.0%)	5 (10.0%)	3 (6.0%)
2	2 (4.0%)	0 (0.0%)	0 (0.0%)
Lignocaine group			
0	25 (50.0%)	36 (72.0 %)	43 (86.0%)
1	21 (42.0%)	14 (28.0%)	7 (14.0%)
2	4 (8.0%)	0 (0.0%)	0(0.0%)
Fluticasone group			
0	41 (82.0%)	47 (94.0%)	48 (96.0%)
1	9 (18.0%)	3 (6.0%)	2 (4.0%)
2	0 (0.0%)	0 (0.0%)	0.0 (0.0%)
$^{KW}\chi^2$ **(p)**	14.072* (0.001*)	10.900* (0.004*)	3.779 (0.151)
p_1	0.008*	0.022*	0.185
p_2	0.413	0.463	0.648
p_3	0.001*	0.004*	0.082

$^{KW}\chi^2$: Kruskal Wallis test.
p : p value for comparing between the three studied groups.
p_1 : p value for Mann Whitney test for comparing between benzydamine and lignocaine.
p_2 : p value for Mann Whitney test for comparing between benzydamine and fluticasone.
p_3 : p value for Mann Whitney test for comparing between lignocaine and fluticasone.
*: Statistically significant at $p \leq 0.05$.

Postoperative sore throat (POST) score

Changes in the observed POST score showed significant differences in the observed incidence at all periods compared to the observed incidence one hour postextubation, p (≤ 0.05), in group I (the benzydamine group), there was significant increase of the POST incidence six hours postextubation, 30% of patients had a POST score of 1, 8% of patients had a POST score of 2 and 2% of patients had a POST score of 3 compared to 24% of patients had a POST score of 1, 6% of patients had a POST score of 2 and no observed incidence of score 3 one hour postextubation, and there was significant decrease of POST incidence 12 and 24 hours postextubation compared to its observed incidence one hour postextubation.

Table (XVI): Distribution of the studied cases according to four point score for postoperative sore throat (POST) in benzydamine group

POST score	Postextubation			
	1 hour	6 hours	12 hours	24 hours
0	35 (70.0%)	30 (60.0%)	41 (82.0%)	41 (82.0%)
1	12 (24.0%)	15 (30.0%)	8 (16.0%)	9 (18.0%)
2	3 (6.0%)	4 (8.0%)	1 (2.0%)	0 (0.0%)
3	0 (0.0%)	1 (2.0%)	0 (0.0%)	0 (0.0%)
p		0.021*	0.021*	0.029*

p: p value for Wilcoxon signed ranks test for comparing between 1 hour with each other period.
*: Statistically significant at $p \leq 0.05$.

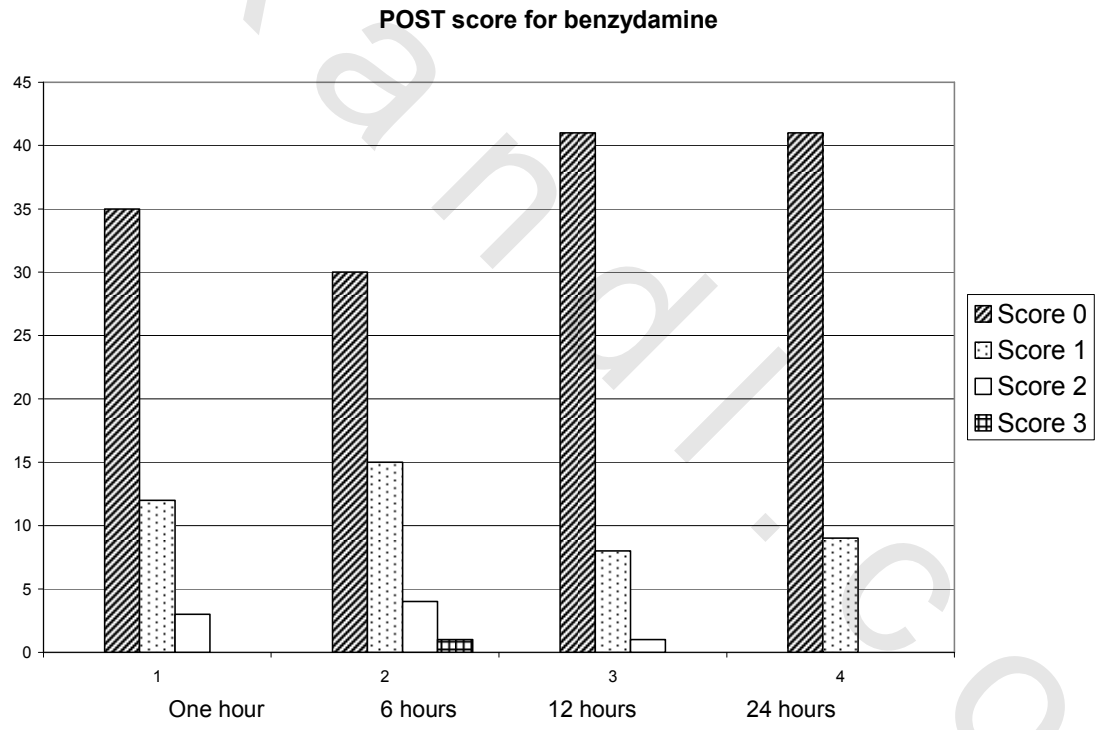

Figure (10): Postoperative sore throat score for benzydamine.

Changes in the POST score showed significant differences in the observed incidence six and 12 hours postextubation compared to the observed incidence one hour postextubation, p (≤ 0.05), in group II (the lignocaine group), there was significant increase of POST incidence six hours post-extubation, with 42% of patients had a POST score of 1, 14% of patients had a POST score of 2 and 6% of patients had a POST score of 3 compared to 40% of patients had a POST score of 1, 8% of patients had a POST score of 2 and 2% of patients had a POST score of 3 one hour postextubation, and there was significant decrease of POST incidence of score 2 and 3(no observation) at 12 hours postextubation compared to the observed incidence one hour post-extubation.

Table (XVII): Distribution of the studied cases according to four point score for postoperative sore throat (POST) in lignocaine group

POST score	Postextubation			
	1 hour	6 hours	12 hours	24 hours
0	25 (50.0%)	19 (38.0%)	30 (60.0%)	31 (82.0%)
1	20 (40.0%)	21 (42.0%)	20 (40.0%)	19 (38.0%)
2	4 (8.0%)	7 (14.0%)	0 (0.0%)	0 (0.0%)
3	1 (2.0%)	3 (6.0%)	0 (0.0%)	0 (0.0%)
p		0.030*	0.034*	0.055

p: p value for Wilcoxon signed ranks test for comparing between 1 hour with each other period.
*: Statistically significant at p ≤ 0.05.

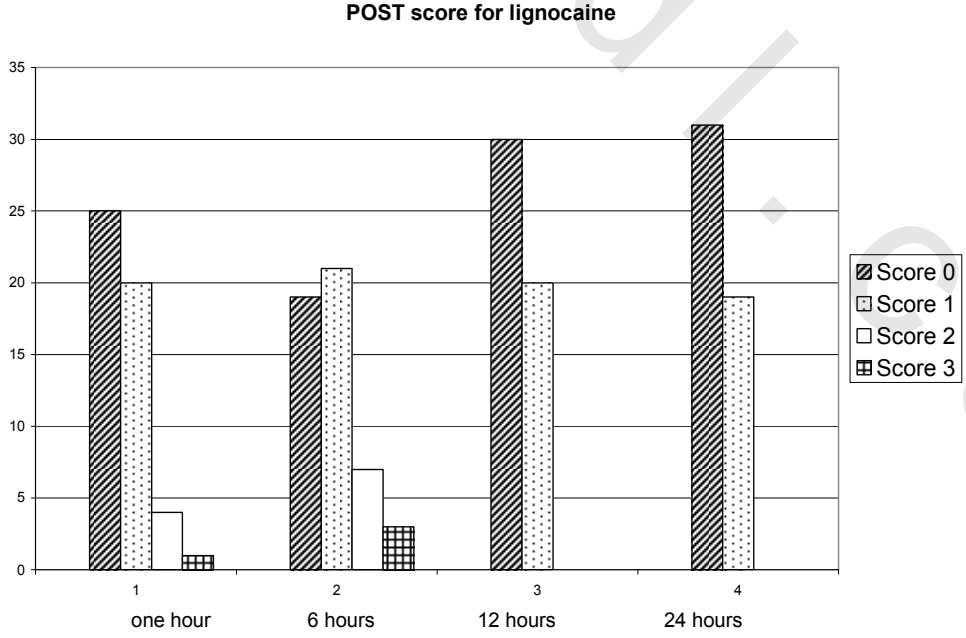

Figure (11): Postoperative sore throat score for lignocaine.

Changes in the POST score showed significant differences in the observed incidence six hours postextubation compared to the observed incidence one hour postextubation, p (≤ 0.05), in group III (the fluticasone group), there was significant increase of POST incidence of score 1 and 2 six hours postextubation, with 26% of patients had a POST score of 1 and 4% of patients had a POST score of 2 six hours postextubation compared to 14% of patients had POST score of 1 and there was no observed incidence of POST score of 2 one hour postextubation.

No observed incidence of POST score of 2 in group III (the fluticasone group) patients at 1, 12 and 24 hours postextubation.

No observed incidence of POST score of 3 in group III (the fluticasone group) patients at any period.

Table (XVIII): Distribution of the studied cases according to four point score for postoperative sore throat (POST) in fluticasone group

POST score	Postextubation			
	1 hour	6 hours	12 hours	24 hours
0	43 (86.0%)	35 (70.0%)	44 (88.0%)	42 (84.0%)
1	7 (14.0%)	13 (26.0%)	6 (12.0%)	8 (16.0%)
2	0 (0.0%)	2 (4.0%)	0 (0.0%)	0 (0.0%)
3	0 (0.0%)	0 (0%)	0 (0.0%)	0 (0.0%)
p		0.002*	0.705	0.763

p: p value for Wilcoxon signed ranks test for comparing between 1 hour with each other period.
*: Statistically significant at p ≤ 0.05.

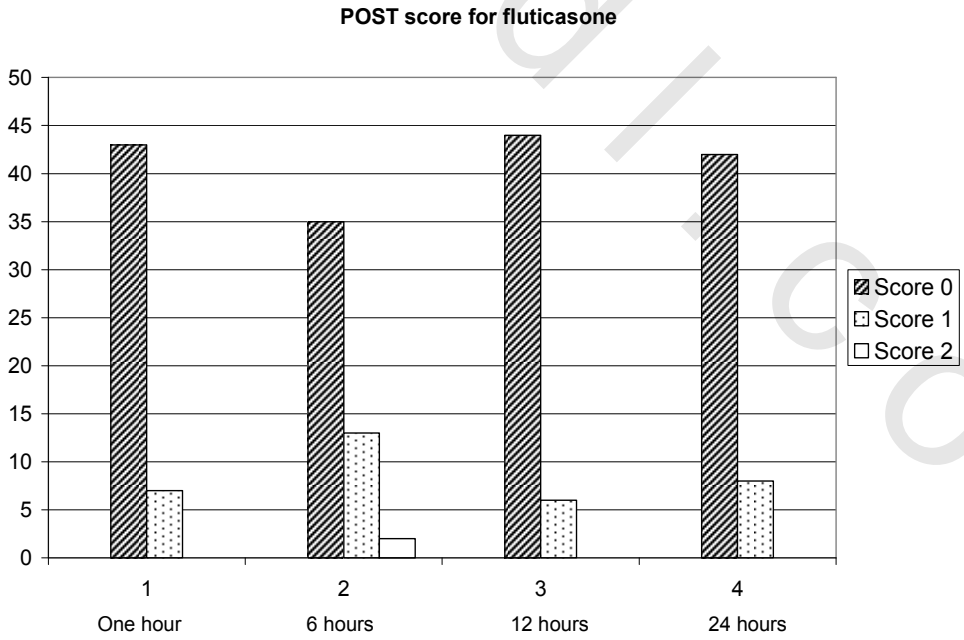

Figure (12): Postoperative sore throat score for fluticasone.

Comparison between the three studied groups showed significant differences, p (≤ 0.05), between groups I and II, and between groups II and III, in the POST incidence observed at all periods, with the most POST observed incidence in group II (the lignocaine group) patients.

There was slight difference of statistical significance between groups I and III, p (≤ 0.05), in the POST score of 1 and 2 incidence observed at the one hour postextubation period, with more POST incidence observed in group I (the benzydamine group) compared to group III (the fluticasone group).

Table (XIX): Comparison between the three studied groups according to four point score for postoperative sore throat (POST)

POST score	Postextubation			
	1 hour	6 hours	12 hours	24 hours
Benzydamine group				
0	35 (70.0%)	30 (60.0%)	41 (82.0%)	41 (82.0%)
1	12 (24.0%)	15 (30.0%)	8 (16.0%)	9 (18.0%)
2	3 (6.0%)	4 (8.0%)	1 (2.0%)	0 (0.0%)
3	0 (0.0%)	1 (2.0%)	0 (0.0%)	0 (0.0%)
Lignocaine group				
0	25 (50.0%)	19 (38.0%)	30 (60.0%)	31 (82.0%)
1	20 (40.0%)	21 (42.0%)	20 (40.0%)	19 (38.0%)
2	4 (8.0%)	7 (14.0%)	0 (0.0%)	0 (0.0%)
3	1 (2.0%)	3 (6.0%)	0 (0.0%)	0 (0.0%)
Fluticasone group				
0	43 (86.0%)	35 (70.0%)	44 (88.0%)	42 (84.0%)
1	7 (14.0%)	13 (26.0%)	6 (12.0%)	8 (16.0%)
2	0 (0.0%)	2 (4.0%)	0 (0.0%)	0 (0.0%)
3	0 (0.0%)	0 (0%)	0 (0.0%)	0 (0.0%)
$^{KW}\chi^2$ (p)	15.740* (<0.001*)	12.507* (0.002*)	11.751* (0.003*)	8.060* (0.018*)
p_1	0.045*	0.024*	0.020*	0.027*
p_2	0.044*	0.238	0.385	0.791
p_3	<0.001*	0.001*	0.001*	0.014*

$^{KW}\chi^2$: Kruskal Wallis test.
p : p value for comparing between the three studied groups.
p_1 : p value for Mann Whitney test for comparing between benzydamine and lignocaine.
p_2 : p value for Mann Whitney test for comparing between benzydamine and fluticasone.
p_3 : p value for Mann Whitney test for comparing between lignocaine and fluticasone.
*: Statistically significant at p ≤ 0.05.