

AIM OF THE WORK

To compare between isoflurane and sevoflurane as regards:

- The ease of inhalational induction and incidence of complications.
- Intubation conditions with the use of low dose rocuronium.

PATIENTS

After approval of Local Ethics Committee and obtaining written informed consents from parents of patients, this study will be carried out in Alexandria University Hospitals on elective day-case surgery paediatric patients aged 2 to 8 years, ASA physical status I & II. This study will be carried out on elective day-case tonsillectomy operations.

Exclusion criteria :

1. Children with history of bronchial asthma or any other hyper-reactive airway disease.
2. Previous history of difficult intubation.
3. History of obstructive sleep apnea, coagulopathy or congenital heart disease.
4. History of allergic reactions to muscle relaxants.
5. Family history of anaesthesia related death in 1st degree relative.
6. Children with spinal deformity or other musculoskeletal disorders.
7. Children who are obese or their external airway examination suggestive for difficult intubation.
8. Patients having full stomach.

Forty ASA I and II children will be randomly categorized into two equal groups -20 in each, as sample size is recommended by Statistical Department of Medical Public Health Institute.

After a computerized random selection, the children will be assigned to one of two groups:

Group 1: Induction and intubation by isoflurane and rocuronium 0.3mg/kg.

Group 2: Induction and intubation by sevoflurane and rocuronium 0.3mg/kg.

METHODS

All patients were undergo:

- **Preoperative evaluation and preparation:**

- 1) History taking to exclude :
 - Cardiovascular, respiratory, neurologic and metabolic diseases.
 - Previous anaesthetic problems.
 - Drug allergies.
- 2) Complete physical examination.
- 3) Airway assessment including:
 - Exclusion of any obvious airway abnormality or specific syndrome associated with a difficult airway.
 - The relative size of the oral cavity is assessed by asking the child to open his or her mouth.
 - The Mallampati classification system as modified by Samsoon and Young (classifies the degree of airway difficulty based on the ability to visualize the faucial pillars, soft palate, and uvula).
 - The inter-incisor distance: less than two fingertips in breadth can be associated with a difficult airway.
 - Range of motion at the atlanto-occipital joint cervical spine.
 - The so-called potential displacement area (between the anterior ramus of the mandible and the hyoid bone): two fingers in children, and one finger in infants.
- 4) Routine laboratory investigations:
 - Complete blood count (CBC).
 - Prothrombin time (PT) and activity.
 - Activated Partial Thromboplastintime (aPTT).

- **Anaesthetic technique:**

- ❖ All children were weighted before pre-medication.
- ❖ **Premedication:** all patients will be pre-medicated with oral Midazolam (0.5mg/ kg) 30-60 minutes before the induction.
- ❖ **Monitoring:** each patient will be attached to
 - ♣ a multi-channel monitor **Hewlett Packard (HP) Viridia 24** for continuous display of:
 - Non-invasive blood pressure (NIBP).
 - Electrocardiogram (ECG) leads II.
 - Oxygen saturation (SpO₂).
 - Heart rate.
 - Respiratory rate.
 - End tidal CO₂.
- And baseline vital signs will be recorded before induction of anaesthesia.
- ❖ Anaesthesia will be administered by using primed paediatric breathing systems and appropriately sized paediatric masks.

In Group 1: Anaesthesia will be induced using a vaporizer set at 0.5MAC isoflurane in oxygen 6 l/min and isoflurane concentration will be increased gradually to reach 3MAC. Initially, spontaneous respiration will be maintained. After loss of consciousness, an IV cannula will be inserted and rocuronium 0.3mg/kg will be administered. Rapid manual ventilation at a low pressure will be started with isoflurane maintained at 3MAC. 2 minutes after start of induction, direct laryngoscopy and tracheal intubation will be attempted with an uncuffed tracheal tube size (ID age/4 +4 mm).

In Group 2: Anaesthesia will be induced using a vaporizer set at 0.5MAC sevoflurane in oxygen 6 l/min and sevoflurane concentration will be increased gradually to reach 3MAC. After loss of consciousness, an IV cannula will be inserted; rocuronium 0.3mg/kg will be injected. Rapid manual ventilation at a low pressure will be started after rocuronium injection with sevoflurane maintained at 3MAC. 2 minutes after induction, direct laryngoscopy and tracheal intubation will be attempted with an uncuffed tracheal tube size (ID age/4+4 mm).

- All tracheal intubations were attempted and scored by an anaesthesiologist blinded to the group.
- Tube position will be confirmed by end-tidal CO₂, direct vision of endotracheal tube passing between the vocal cords, chest auscultation of bilateral equal air entry and patient SpO₂.
- If an attempt to intubate the trachea failed, the patient will be managed as considered appropriate by anaesthesiologist in charge of the patient and patient will be excluded from the study.
- Muscle paralysis will be reversed using neostigmine (0.05mg/kg) and atropine (0.02mg/kg) at the end of the procedure.

Measurements

The following parameters will be measured in all patients:

1) Hemodynamic measurements:

- Heart rate (beats / minute).
- Systolic arterial blood pressure (SBP).
- Arterial oxygen saturation (SpO₂).

These measurements will be recorded at the following times:

- ❖ Pre-operatively before induction.
- ❖ Intra-operatively:
 - After inhalational induction.
 - Immediately before intubation.
 - Immediately after intubation.
 - 2 minutes after intubation.
 - 5 minutes after intubation.
 - 10 minutes after intubation.

2) Sedation will be assessed according to Ramsay sedation score

Table (1): Ramsay sedation score

Score	Response
1	Anxious or restless or both
2	Cooperative, orientated and tranquil
3	Responding to commands
4	Brisk response to stimulus
5	Sluggish response to stimulus
6	No response to stimulus

3) Time from: Isoflurane or Sevoflurane

- Induction to loss of consciousness.
- Induction to successful endotracheal intubation.
- Successful endotracheal intubation to return of spontaneous breathing.

4) Airway condition, ease of intubation and response to intubation will be assessed by using a scoring system:-

- a) Laryngoscopy.
- b) Vocal cord.
- c) Coughing.
- d) Jaw relaxation.
- e) Limb movement.

Table (2): Scoring system for intubating conditions.

Score	1	2	3	4
Laryngoscopy	Easy	Fair	difficult	impossible
Vocal cords	Open	Moving	Closing	closed
coughing	None	Slight	moderate	severe
Jaw relaxation	Complete	Slight	Stiff	rigid
Limb movement	None	Slight	moderate	severe

5) Incidence of hoarseness of voice, post-extubation croup and post-extubation laryngeal spasm in the immediate postoperative period.

RESULTS

The present study was carried out in Alexandria University Hospitals on elective day-case surgery paediatric patients aged 2 to 8 years, ASA physical status I & II and included elective day-case tonsillectomy operations.

After a computerized random selection, the children were assigned to one of two groups:

Group 1: Induction and intubation by isoflurane and rocuronium 0.3mg/kg.

Group 2: Induction and intubation by sevoflurane and rocuronium 0.3mg/kg.

Demographic data

Table (3) and figures (5-7) shows comparison between the two studied groups regarding sex, the sevoflurane group contains 14 (70%) males and 6 (30%) females while the isoflurane group contains 15(75%) males and 5(20%) females. Regarding age, the sevoflurane group the age range between 3-7 years while the isoflurane group the age range between 2-7 years. There were no statistical significant differences between the two studied groups regarding sex (P=0.723) and age (P=0.123).

Table (3): Comparison between the two studied groups regarding sex and age (years)

	Sevoflurane (n = 20)		Isoflurane (n = 20)		Test of sig.	P
	No.	%	No.	%		
Sex						
Male	14	70.0	15	75.0	$\chi^2 = 0.125$	0.723
Female	6	30.0	5	25.0		
Age (years)						
Min. – Max.	3.0 – 7.0		2.0 – 7.0		t = 1.577	0.123
Mean ± SD	4.65 ± 1.23		4.0 ± 1.38			

P: P value for comparing between the two studied groups

χ^2 : Chi-square test

t: Student t-test

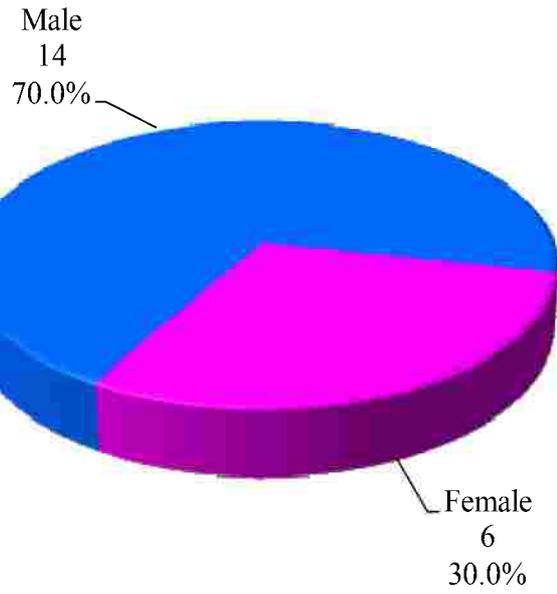


Figure (5): Comparison according to sex in sevoflurane group

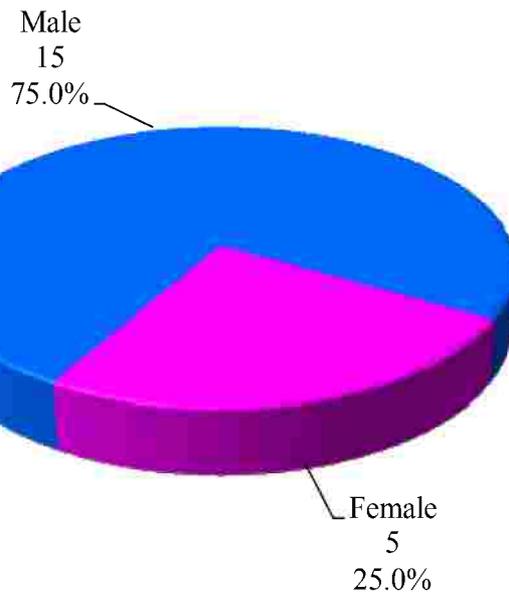


Figure (6): Comparison according to sex in Isoflurane group

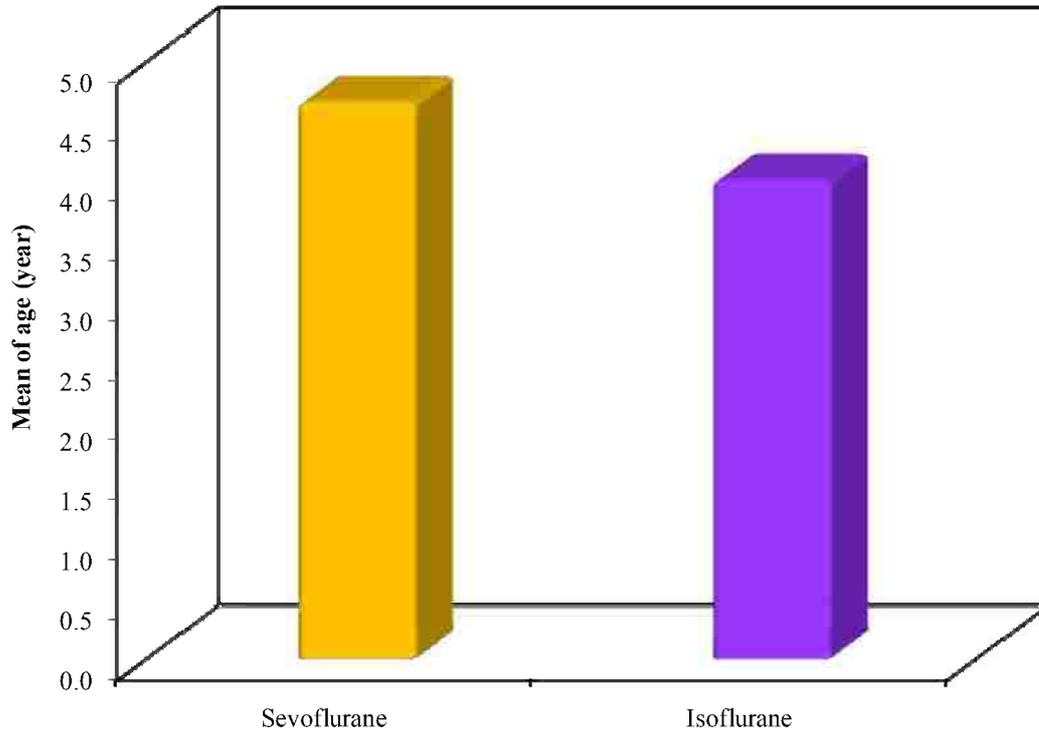


Figure (7): Comparison between the two studied groups according to age (years)

Heart rate

Tables (4-6) and figure (8) shows comparison between the two studied groups regarding heart rate, it illustrated that, there were no statistical significant differences between the two studied groups regarding heart rate at different times, except:

Before intubation: isoflurane group had values statistically higher than sevoflurane group (114.25 ± 6.34 and 104.0 ± 5.76 beats/min) for isoflurane and sevoflurane groups respectively ($P=0.001$).

After intubation: isoflurane group had values statistically higher than sevoflurane group (125.25 ± 5.95 and 120.0 ± 7.25 beats/min) for isoflurane and sevoflurane groups respectively ($P=0.017$).

After 2 minutes, isoflurane group had values statistically higher than sevoflurane group (123.0 ± 5.71 and 119.50 ± 5.10 beats/min) for isoflurane and sevoflurane groups respectively ($P=0.048$).

After 10 minutes: sevoflurane group had values statistically higher than isoflurane group (112.50 ± 5.50 and 105.0 ± 6.07 beats/min) for sevoflurane and isoflurane groups respectively ($P=0.001$).

Results

Table (4): Changes in heart rate in sevoflurane group (n = 20)

Cases No.	Heart rate (beats/ min)						
	Preoperative base line	After inhalational induction	Before intubation	After intubation	After 2 minutes	After 5 minutes	After 10 minutes
Min.	90.0	120.0	95.0	110.0	110.0	100.0	100.0
Max.	110.0	140.0	115.0	130.0	130.0	120.0	120.0
Mean	105.50	128.75	104.0	120.0	119.50	113.0	112.50
SD.	5.60	5.10	5.76	7.25	5.10	5.71	5.50
P		<0.001*	p>0.05 (NS)	<0.001*	<0.001*	0.013*	0.013*

p: Stands for adjusted Bonferroni p-value for ANOVA with repeated measures for comparison between Base line with each other period

*: Statistically significant at $p \leq 0.05$

Table (5): Changes in heart rate in isoflurane group (n = 20)

Cases No.	Heart rate (beats/ min)						
	Preoperative base line	After inhalational induction	Before intubation	After intubation	After 2 minutes	After 5 minutes	After 10 minutes
Min.	90.0	120.0	105.0	110.0	110.0	100.0	100.0
Max.	120.0	140.0	130.0	130.0	130.0	120.0	120.0
Mean	108.25	129.25	114.25	125.25	123.0	111.0	105.0
SD.	7.99	5.68	6.34	5.95	5.71	6.41	6.07
P		<0.001*	0.018*	<0.001*	<0.001*	p>0.05 (NS)	p>0.05 (NS)

p: Stands for adjusted Bonferroni p-value for ANOVA with repeated measures for comparison between Base line with each other period

*: Statistically significant at $p \leq 0.05$

Results

Table (6): Comparison between the studied groups regarding changes in heart rate (n=20)

	Heart rate (beats/ min)						
	Preoperative baseline	After inhalational induction	Before intubation	After intubation	After 2 minutes	After 5 minutes	After 10 minutes
Sevoflurane							
Min.	90.0	120.0	95.0	110.0	110.0	100.0	100.0
Max.	110.0	140.0	115.0	130.0	130.0	120.0	120.0
Mean	105.50	128.75	104.0	120.0	119.50	113.0	112.50
SD.	5.60	5.10	5.76	7.25	5.10	5.71	5.50
Isoflurane							
Min.	90.0	120.0	105.0	110.0	110.0	100.0	100.0
Max.	120.0	140.0	130.0	130.0	130.0	120.0	120.0
Mean	108.25	129.25	114.25	125.25	123.0	111.0	105.0
SD.	7.99	5.68	6.34	5.95	5.71	6.41	6.07
T	1.260	0.293	5.352*	2.502*	2.043*	1.042	4.094*
P	0.215	0.771	<0.001*	0.017*	0.048*	0.304	<0.001*

t: Student t-test

*: Statistically significant at $p \leq 0.05$

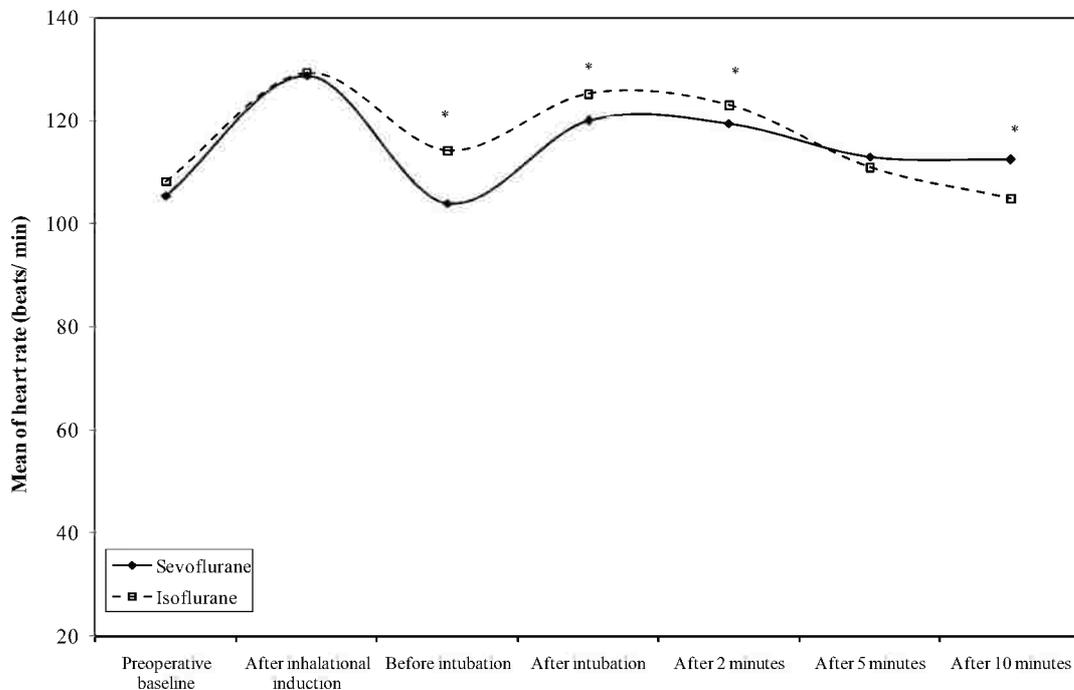


Figure (8): Comparison between the studied groups regarding changes in heart rate

Systolic blood pressure

Tables (7-9) and figure (9) shows comparison between the two studied groups regarding systolic blood pressure. It demonstrated that, there were no statistical significant differences between the two studied groups regarding systolic blood pressure at different times, except:

After intubation: isoflurane group had values statistically higher than sevoflurane group (129.50±6.86 and 121.0±7.18 mmHg) for isoflurane and sevoflurane groups respectively (P=0.001).

After 2 minutes, isoflurane group had values statistically higher than sevoflurane group (121.0±6.41 and 116.0±5.03 beats/min) for isoflurane and sevoflurane groups respectively (P=0.009).

Table (7): Changes in systolic blood pressure in sevoflurane group (n = 20)

Cases No.	Systolic blood pressure (mmHg)						
	Preoperative base line	After inhalational induction	Before intubation	After intubation	After 2 minutes	After 5 minutes	After 10 minutes
Min.	100.0	110.0	110.0	110.0	110.0	100.0	100.0
Max.	120.0	130.0	120.0	130.0	120.0	120.0	130.0
Mean	109.0	120.50	115.0	121.0	116.0	110.50	110.50
SD.	6.41	7.59	5.13	7.18	5.03	6.05	8.26
P		0.007*	0.044*	<0.001*	0.009*	p>0.05 (NS)	p>0.05 (NS)

p: Stands for adjusted Bonferroni p-value for ANOVA with repeated measures for comparison between Baseline with each other period

*: Statistically significant at $p \leq 0.05$

Table (8): Changes in systolic blood pressure in isoflurane group (n = 20)

Cases No.	Systolic blood pressure (mmHg)						
	Preoperative base line	After inhalational induction	Before intubation	After intubation	After 2 minutes	After 5 minutes	After 10 minutes
Min.	100.0	110.0	110.0	120.0	110.0	100.0	100.0
Max.	120.0	140.0	130.0	140.0	130.0	120.0	120.0
Mean	108.50	124.0	118.0	129.50	121.0	110.50	111.50
SD.	6.71	9.95	5.23	6.86	6.41	6.86	6.71
P		<0.001*	<0.001*	<0.001*	<0.001*	p>0.05 (NS)	p>0.05 (NS)

p: Stands for adjusted Bonferroni p-value for ANOVA with repeated measures for comparison between Baseline with each other period

*: Statistically significant at $p \leq 0.05$

Results

Table (9): Comparison between the studied groups regarding changes in systolic blood pressure (n = 20)

	Systolic blood pressure (mmHg)						
	Preoperative base line	After inhalational induction	Before intubation	After intubation	After 2 minutes	After 5 minutes	After 10 minutes
Sevoflurane							
Min.	100.0	110.0	110.0	110.0	110.0	100.0	100.0
Max.	120.0	130.0	120.0	130.0	120.0	120.0	130.0
Mean	109.0	120.50	115.0	121.0	116.0	110.50	110.50
SD.	6.41	7.59	5.13	7.18	5.03	6.05	8.26
Isoflurane							
Min.	100.0	110.0	110.0	120.0	110.0	100.0	100.0
Max.	120.0	140.0	130.0	140.0	130.0	120.0	120.0
Mean	108.50	124.0	118.0	129.50	121.0	110.50	111.50
SD.	6.71	9.95	5.23	6.86	6.41	6.86	6.71
t	0.241	1.251	1.831	3.827*	2.746*	0.0	0.420
P	0.811	0.219	0.075	<0.001*	0.009*	1.000	0.677

t: Student t-test

*: Statistically significant at $p \leq 0.05$

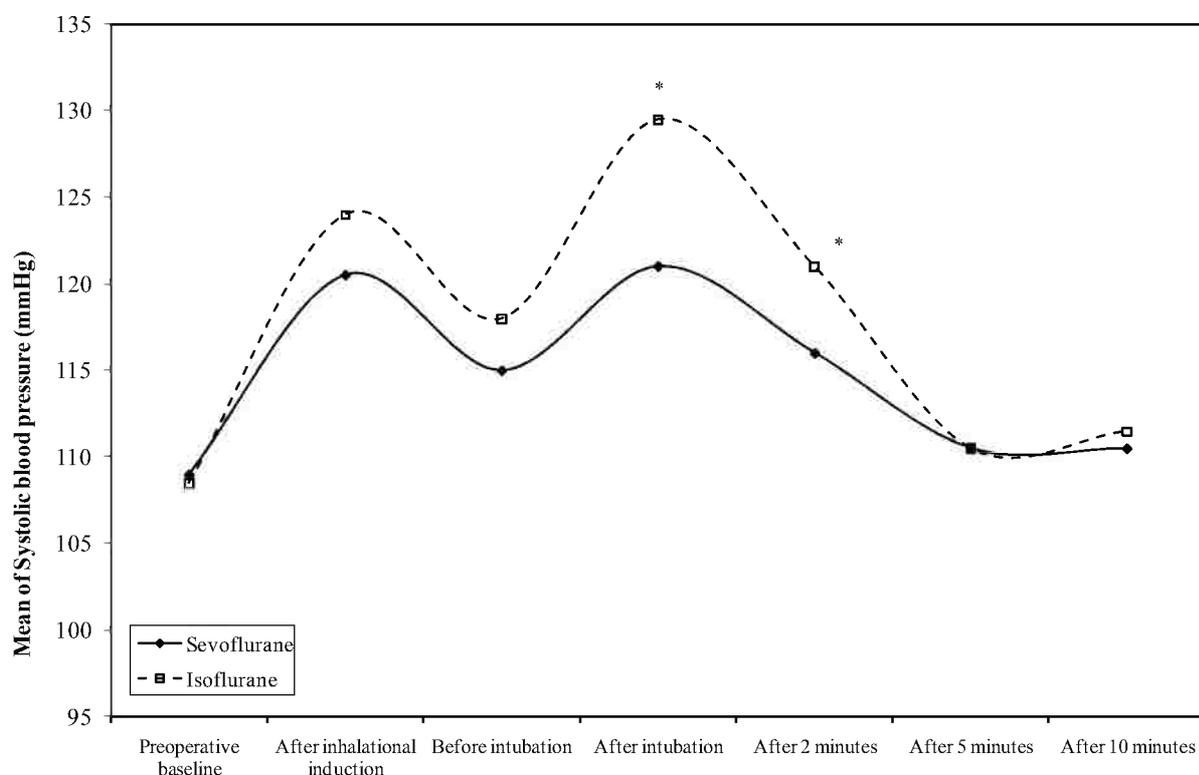


Figure (9): Comparison between the studied groups regarding changes in systolic blood pressure

Pulse oximetry (SpO₂)

Tables (10-12) and figure (10) shows comparison between the two studied groups regarding SpO₂, it illustrated that, there were no statistical significant differences between the two studied groups regarding pulse oximetry at different times.

Table (10): Changes in pulse oximetry (SpO₂) in sevoflurane group (n = 20)

	Pulse oximetry (SpO ₂)						
	Preoperative base line	After inhalational induction	Before intubation	After intubation	After 2 minutes	After 5 minutes	After 10 minutes
Min.	98.0	98.0	98.0	98.0	98.0	98.0	98.0
Max.	100.0	100.0	99.0	99.0	99.0	99.0	99.0
Mean	98.85	99.0	98.50	98.75	98.55	98.85	98.85
SD.	0.49	0.32	0.51	0.44	0.51	0.37	0.37

Table (11): Changes in pulse oximetry (SpO₂) in isoflurane group (n = 20)

	Pulse oximetry (SpO ₂)						
	Preoperative base line	After inhalational induction	Before intubation	After intubation	After 2 minutes	After 5 minutes	After 10 minutes
Min.	98.0	98.0	98.0	98.0	98.0	98.0	98.0
Max.	100.0	99.0	99.0	99.0	99.0	99.0	99.0
Mean	98.90	98.85	98.70	98.55	98.75	98.85	98.90
SD.	0.64	0.37	0.47	0.51	0.44	0.37	0.31

Results

Table (12): Comparison between the studied groups regarding changes in pulse oximetry (SpO₂) (n = 20)

	Pulse oximetry (SpO ₂)						
	Preoperative base line	After inhalational induction	Before intubation	After intubation	After 2 minutes	After 5 minutes	After 10 minutes
Sevoflurane							
Min.	98.0	98.0	98.0	98.0	98.0	98.0	98.0
Max.	100.0	100.0	99.0	99.0	99.0	99.0	99.0
Mean	98.85	99.0	98.50	98.75	98.55	98.85	98.85
SD.	0.49	0.32	0.51	0.44	0.51	0.37	0.37
Isoflurane							
Min.	98.0	98.0	98.0	98.0	98.0	98.0	98.0
Max.	100.0	99.0	99.0	99.0	99.0	99.0	99.0
Mean	98.90	98.85	98.70	98.55	98.75	98.85	98.90
SD.	0.64	0.37	0.47	0.51	0.44	0.37	0.31
t	0.277	1.371	1.285	1.322	1.322	0.0	0.467
P	0.783	0.178	0.206	0.194	0.194	1.000	0.643

t: Student t-test

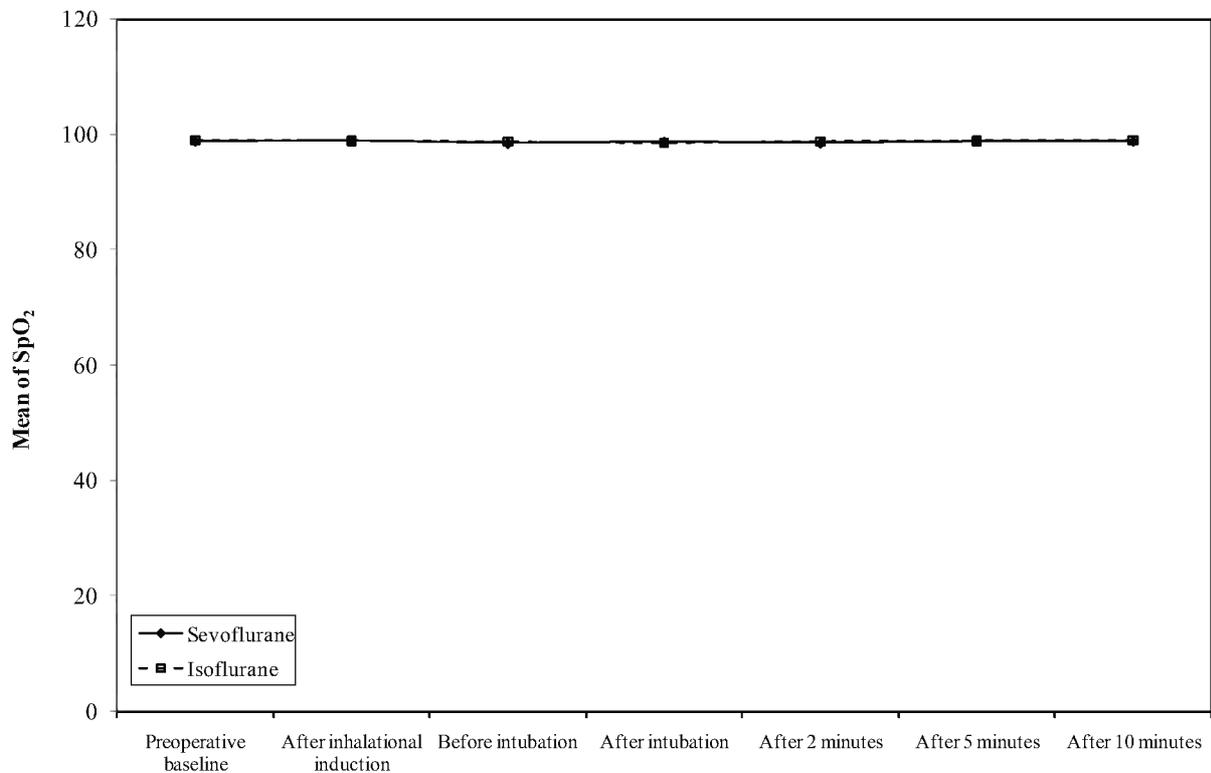


Figure (10): Comparison between the studied groups regarding to pulse oximetry (SpO₂)

Ease of laryngoscopy

Comparison between the two studied groups according to ease of laryngoscopy were presented in table (13) and figure (11), it demonstrated that, laryngoscopy was easy in 12 (60.0%) and 14 (70.0%), laryngoscopy was fair in 7 (35.0%) and 6 (30.0%), laryngoscopy was difficult in 1 (5.0%) and 0 (0.0%) for sevoflurane and isoflurane groups respectively, there were no statistical significant differences between the two studied groups regarding ease of laryngoscopy.

Vocal cords movement

Comparisons between the two studied groups according to vocal cords movement were presented in table (14). It illustrated that, open vocal cords were found in all cases for sevoflurane and isoflurane groups respectively.

Coughing severity

Comparison between the two studied groups according to coughing severity were presented in table (15) and figure (12), it demonstrated that, no coughing was found in 19 (95.0%) and 13 (65%), slight coughing was found in 1 (5.0%) and 6 (30.0%) for sevoflurane and isoflurane groups respectively. Moderate coughing was found in a single case (5%). There were statistical significant differences between the two studied groups regarding coughing severity ($P=0.043$).

Table (13): Comparison between the two studied groups according to ease of laryngoscopy

	Ease of laryngoscopy	
	Sevoflurane	Isoflurane
Easy	12 (60.0%)	14 (70.0%)
Fair	7 (35.0%)	6 (30.0%)
Difficult	1 (5.0%)	0 (0.0%)
Impossible	0 (0.0%)	0 (0.0%)
MC <i>P</i>	0.746	

χ^2 : Value for chi-square
 MC: Monte Carlo test

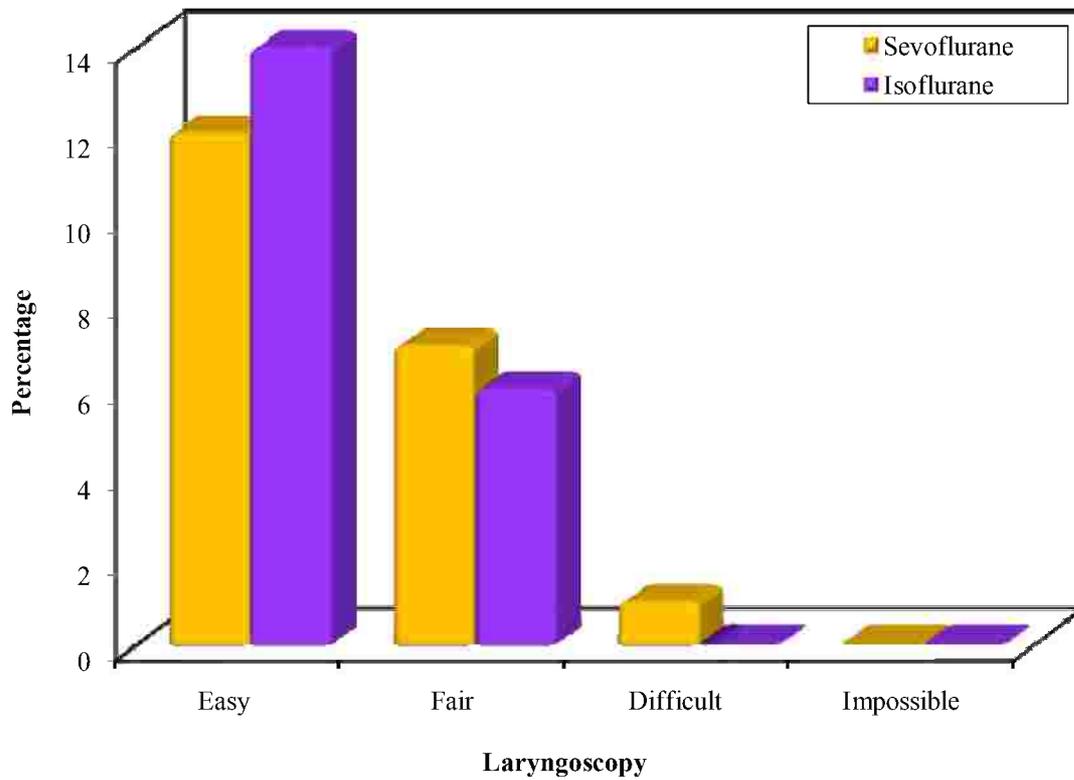


Figure (11): Comparison between the two studied groups according to ease of laryngoscopy

Table (14): Comparison between the two studied groups according to vocal cords movement

	Sevoflurane (n=20)		Isoflurane (n=20)	
	No.	%	No.	%
Vocal cords				
Open	20	100.0	20	100.0
Moving	0	0.0	0	0.0
Closing	0	0.0	0	0.0
Closed	0	0.0	0	0.0

Table (15): Comparison between the two studied groups according to coughing severity

Severity	Coughing	
	Sevoflurane	Isoflurane
None	19 (95.0%)	13 (65%)
Slight	1 (5.0%)	6 (30.0%)
Moderate	0 (0.0 %)	1(5.0 %)
Severe	0 (0.0 %)	0 (0.0 %)
MC <i>P</i>	0.043*	

MC: Monte Carlo test

*: Statistically significant at $p \leq 0.05$

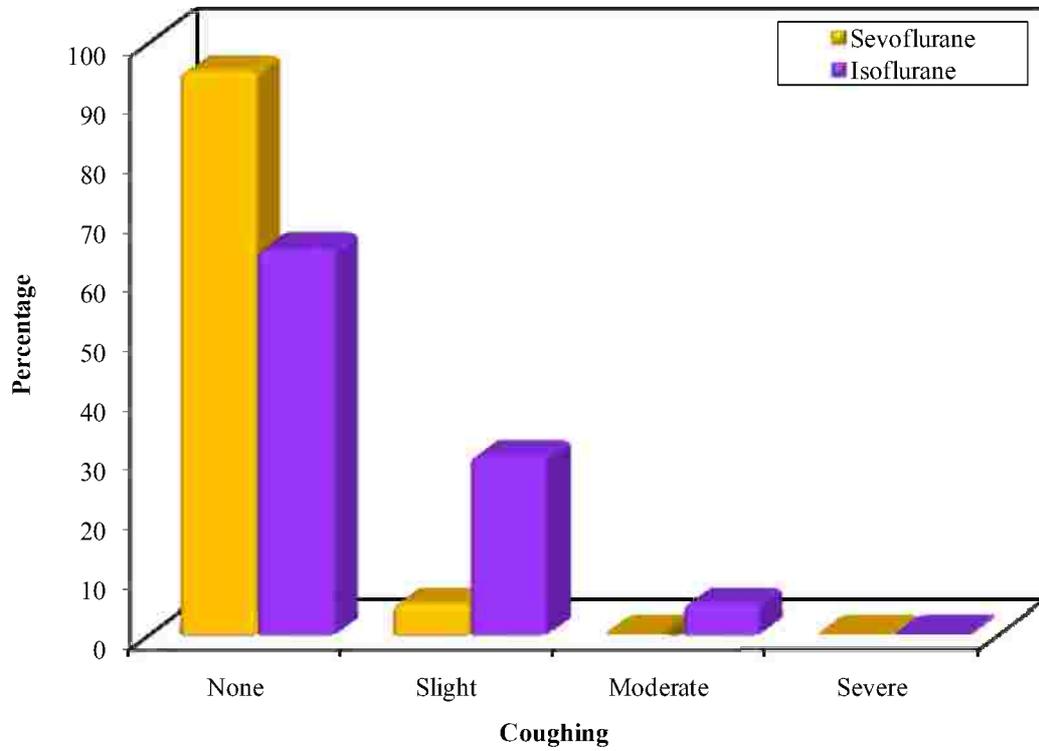


Figure (12): Comparison between the two studied groups according to coughing severity

Jaw relaxation

Comparison between the two studied groups according to jaw relaxation were presented in table (16) and figure (13), it demonstrated that, complete relaxation was found in 17 (85.0%) patients and 19 (95.0%), slight relaxation was found in 3 (15.0%) and 1 (5.0%) patients for sevoflurane and isoflurane groups respectively. There were no statistical significant differences between the two studied groups regarding jaw relaxation. (P=0.605)

Limb movement

Table (17) and figure (14) shows comparison between the two studied groups. It illustrated that, no limb movement was observed in 17 (85.0%) and 16 (80.0%), slight limb movement was observed in 3 (15.0%) and 4 (20.0%) for sevoflurane and isoflurane groups respectively after administration of rocuronium. There were no statistical significant differences between the two studied groups regarding limb movement. (P=1.000)

Table (16): Comparison between the two studied groups according to jaw relaxation

Cases No.	Jaw relaxation	
	Sevoflurane	Isoflurane
Complete	17 (85.0 %)	19 (95.0%)
Slight	3 (15.0%)	1(5.0%)
Stiff	0 (0.0 %)	0 (0.0 %)
Rigid	0 (0.0 %)	0 (0.0 %)
^{FE}P	0.605	

FE: Fisher Exact test

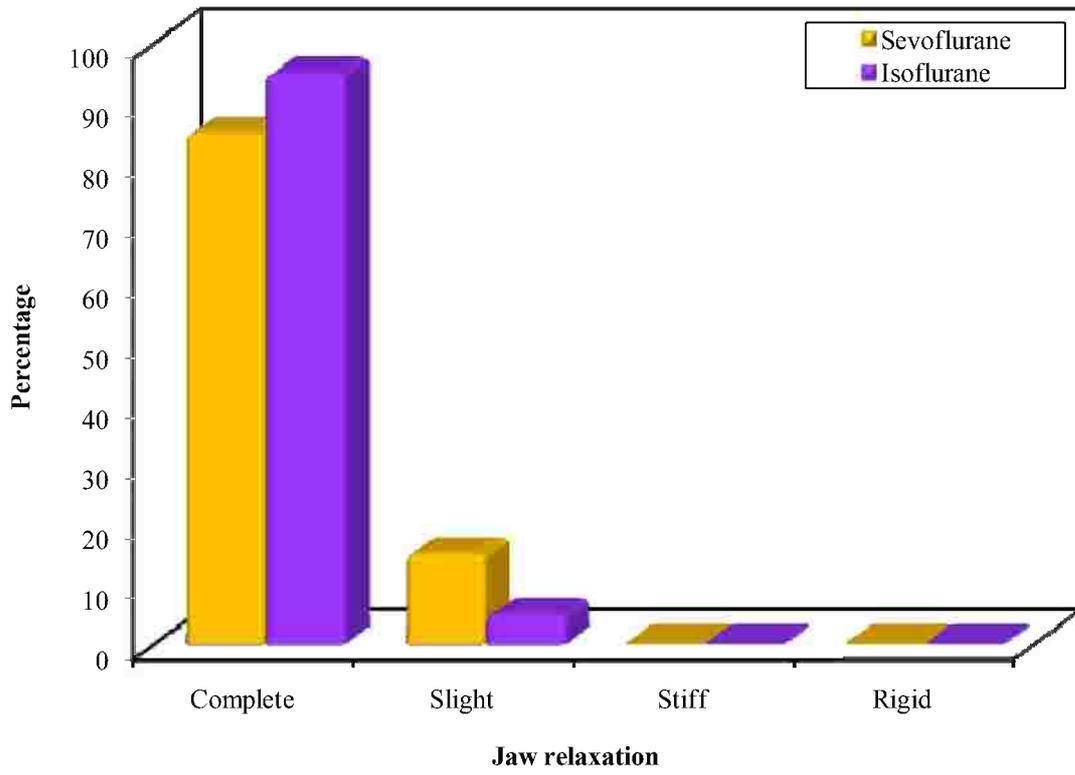


Figure (13): Comparison between the two studied groups according to jaw relaxation

Results

Table (17): Comparison between the two studied groups according to limb movement

Cases No.	Limb movement	
	Sevoflurane	Isoflurane
None	17 (85.0 %)	16 (80.0%)
Slight	3 (15.0 %)	4 (20.0%)
Moderate	0 (0.0%)	0 (0.0%)
Severe	0 (0.0%)	0 (0.0%)
^{FE}P	1.000	

FE: Fisher Exact test

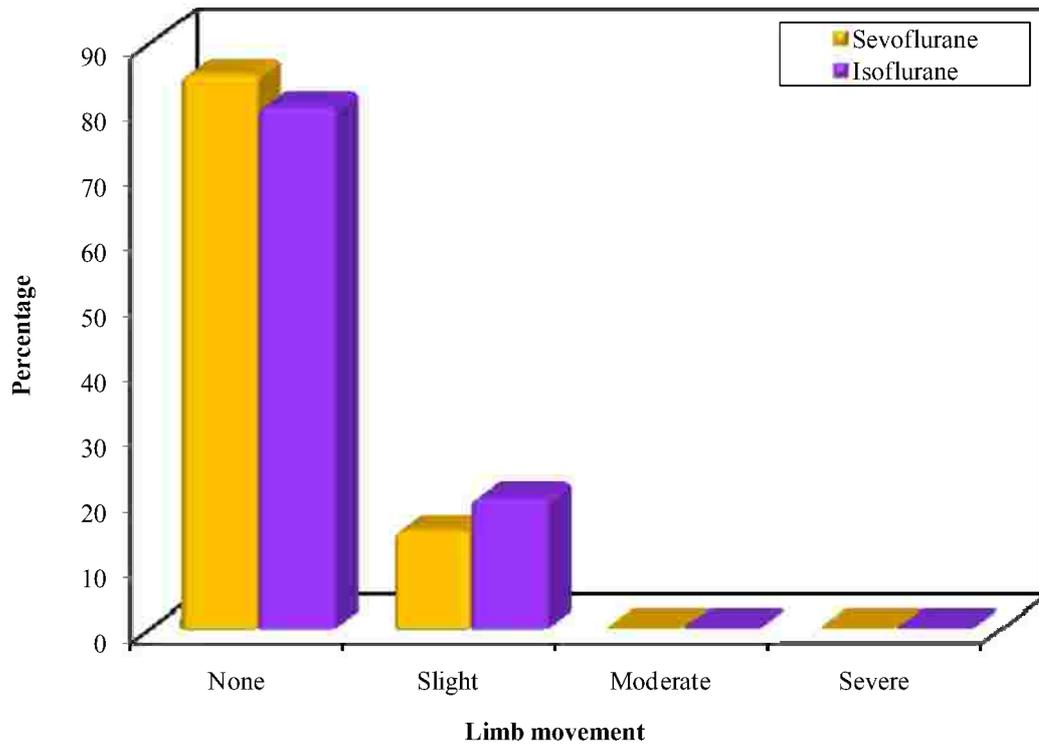


Figure (14): Comparison between the two studied groups according to limb movement

Hoarseness of voice

Table (18) shows comparison between the two studied groups according to hoarseness of voice, Only 1 (5.0%) and 1 (5.0%) patient complained of hoarseness of voice in the sevoflurane and isoflurane groups respectively. There were no statistical significant differences between the two studied groups regarding hoarseness of voice. (P=1.000)

Post-extubation croup

Comparison between the two studied groups according to post-extubation croup group was presented in table (19), only one patient in either group suffered post-extubation croup (5.0%). There were no statistical significant differences between the two studied groups. (P=1.000)

Post-extubation laryngeal spasm

Table (20) shows comparison between the two studied groups according to post-extubation laryngeal spasm, it illustrated that, all cases 20 (100%) had no postoperative hoarseness of voice.

Table (18): Comparison between the two studied groups according to hoarseness of voice

	Sevoflurane (n = 20)		Isoflurane (n = 20)	
	No.	%	No.	%
Hoarseness of voice				
Absent	19	95.0	19	95.0
Present	1	5.0	1	5.0
^{FE}P	1.000			

FE: Fisher Exact test

Table (19): Comparison between the two studied groups according to post-extubation croup

	Sevoflurane (n = 20)		Isoflurane (n = 20)	
	No.	%	No.	%
Post-extubation croup				
Absent	19	95.0	19	95.0
Present	1	5.0	1	5.0
^{FE}P	1.000			

χ^2 : Value for chi-square
FE: Fisher Exact test

Table (20): Comparison between the two studied groups according to post-extubation laryngeal spasm

	Sevoflurane (n = 20)		Isoflurane (n = 20)	
	No.	%	No.	%
Post-extubation laryngeal spasm				
Absent	20	100.0	20	100.0
Present	0	0.0	0	0.0

Sedation score

Table (21) and figure (15) shows comparison between the two studied groups according to sedation score. Brisk responses were found in 2 (10.0%) and 2 (10.0%) patients, sluggish responses were found in 18 (90.0%), and 18 (90.0%) patients for sevoflurane and isoflurane groups respectively. There were no statistical significant differences between the two studied groups regarding sedation score. (P=1.000)

Time from induction to loss of consciousness (seconds)

Comparison between the two studied groups according to time from induction to loss of consciousness was presented in table (22) and figure (16). The duration till loss of consciousness ranged between 120-180 and 180-240 sec. with the mean of 139.80 ± 24.55 and 196.50 ± 18.14 sec. for sevoflurane and isoflurane groups respectively. The isoflurane group had a statistically longer duration to loss of consciousness than sevoflurane group. (P=0.001)

Table (21): Comparison between the two studied groups according to sedation score

Cases No.	Sedation score	
	Sevoflurane	Isoflurane
Anxious	0 (0.0%)	0 (0.0%)
Cooperative	0 (0.0%)	0 (0.0%)
Responding to commands	0 (0.0%)	0 (0.0%)
Brisk	2 (10.0%)	2 (10.0)
Sluggish	18 (90.0%)	18 (90.0)
No	0 (0.0%)	
<i>P</i>	1.000	

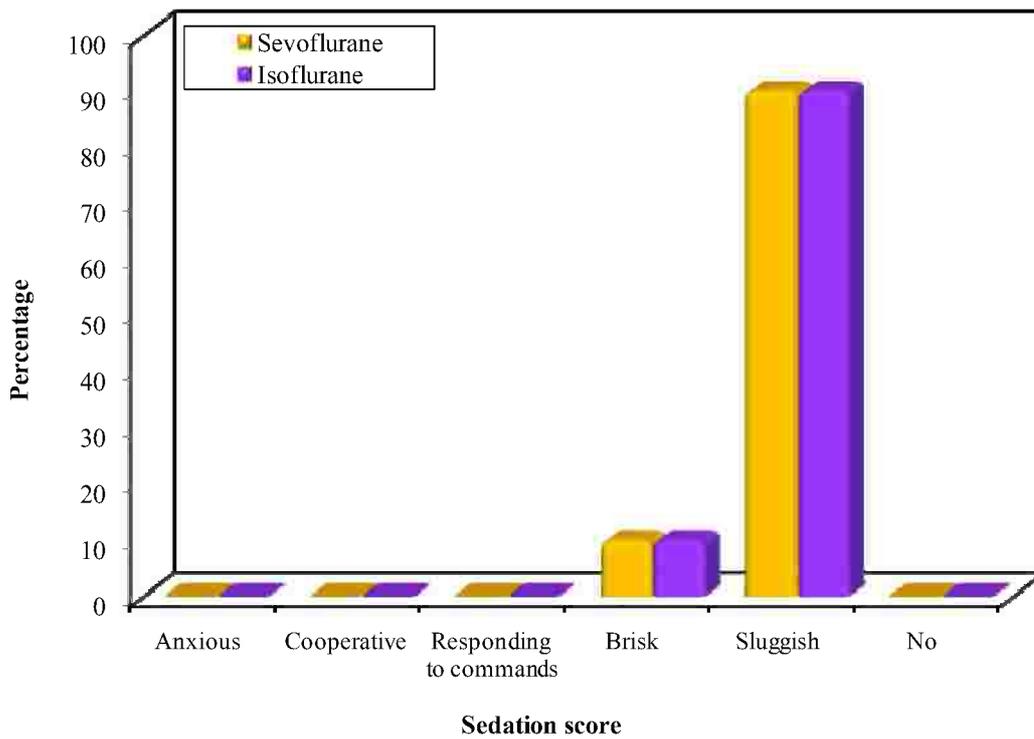


Figure (15): Comparison between the two studied groups according to sedation score

Table (22): Comparison between the two studied groups according to time from induction to loss of consciousness (seconds)

Cases No.	Time from induction to loss of consciousness(seconds)	
	Sevoflurane	Isoflurane
Min.	120	180
Max.	180	240
Mean	139.80	196.50
SD.	24.55	18.14
T	8.305*	
P	<0.001*	

t: Student t-test

*: Statistically significant at $p \leq 0.05$

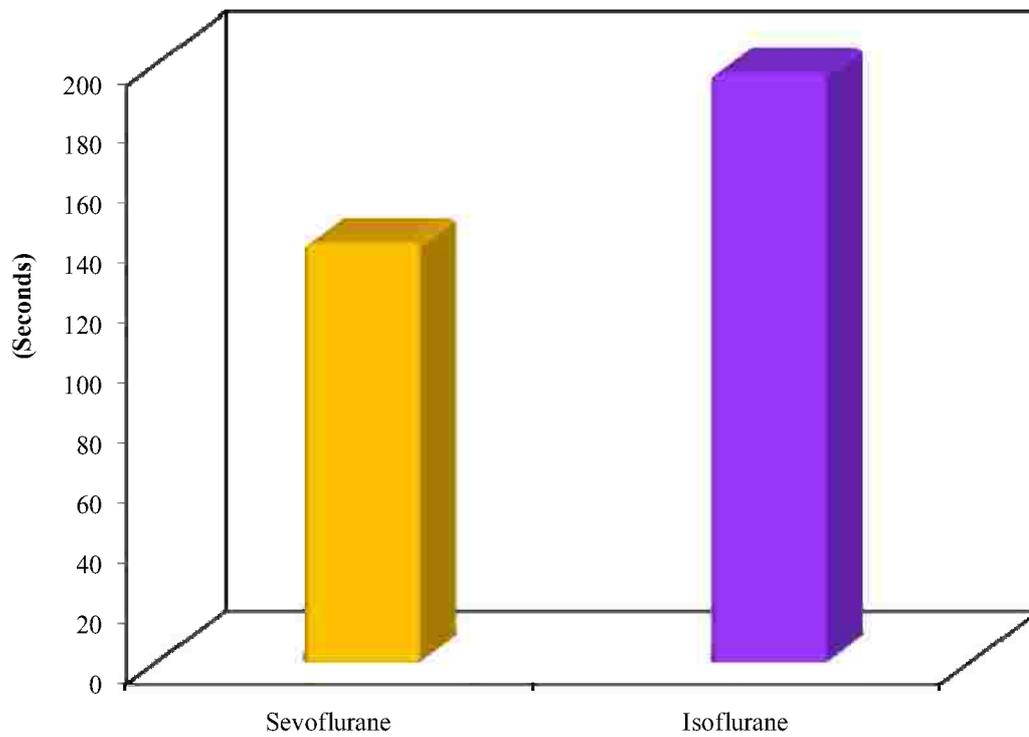


Figure (16): Comparison between the two studied groups according to time from induction to loss of consciousness

Time from induction to successful endotracheal intubation (seconds)

Comparison between the two studied groups according to time from induction to successful endotracheal intubation was presented in table (23) and figure (17). The time to successful intubation ranged between 180-270 and 240-330 sec. with the mean of 223.8 ± 31.50 and 291 ± 25.94 sec. for sevoflurane and isoflurane groups respectively. The isoflurane group had a statistically longer time to intubation than the sevoflurane group. ($P=0.001$)

Time from successful endotracheal intubation to return of spontaneous breathing (minutes)

Comparison between the two studied groups according to time from successful endotracheal intubation to return of spontaneous breathing (minutes) were presented in table (24) and figure (18), it illustrated that, time ranged between 20.0-26.0 and 20.0-26.0 min. with the mean of 22.40 ± 2.09 and 23.00 ± 2.18 minutes for sevoflurane and isoflurane groups respectively. There were no statistical significant differences between the two studied groups. ($P=0.379$)

Table (23): Comparison between the two studied groups according to time from induction to successful endotracheal intubation

Cases No.	Time from induction to successful endotracheal intubation (seconds)	
	Sevoflurane	Isoflurane
Min.	180	240
Max.	270	330
Mean	223.8	291
SD.	31.50	25.94
T	7.398*	
P	<0.001*	

t: Student t-test

*: Statistically significant at $p \leq 0.05$

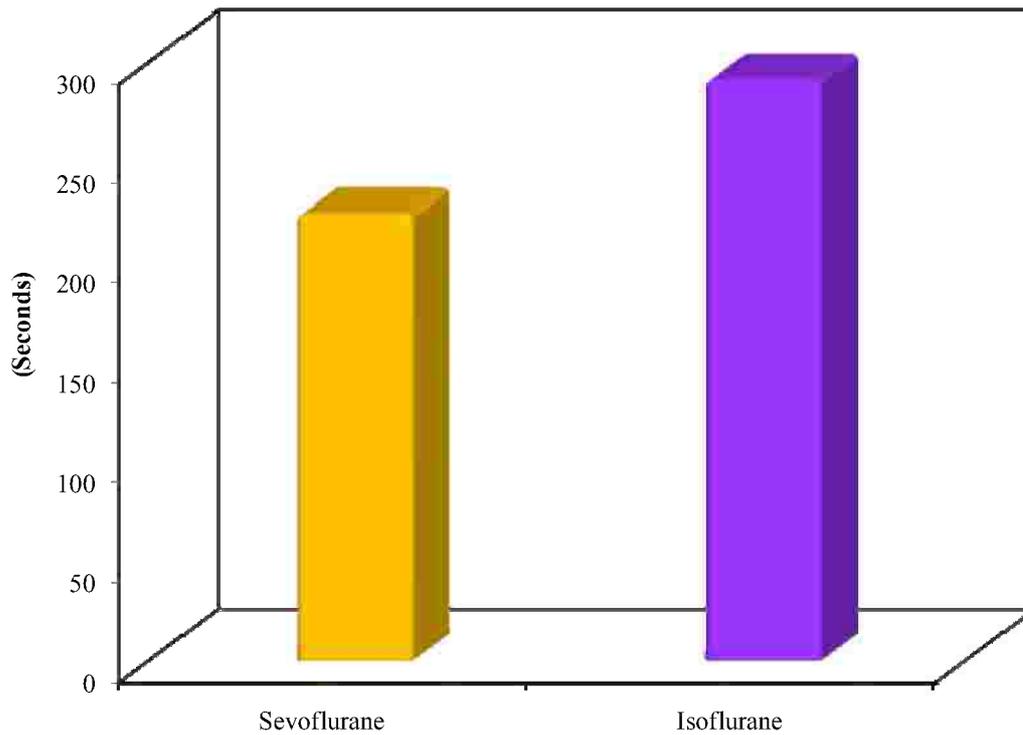


Figure (17): Comparison between the two studied groups according to time from induction to successful endotracheal intubation

Table (24): Comparison between the two studied groups according to time from successful endotracheal intubation to return of spontaneous breathing (minutes)

Cases No.	Time from successful endotracheal intubation to return of spontaneous breathing (minutes)	
	Sevoflurane	Isoflurane
Min.	20.0	20.00
Max.	26.0	26.00
Mean	22.40	23.00
SD.	2.09	2.18
T	0.890	
P	0.379	

t: Student t-test

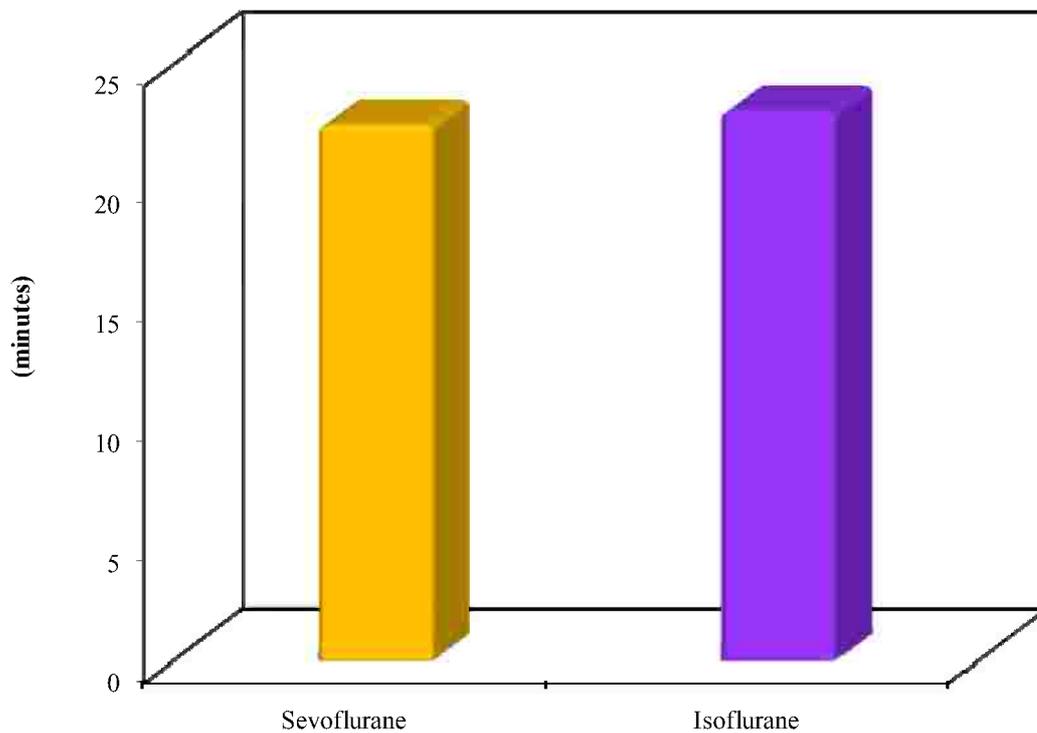


Figure (18): Comparison between the two studied groups according to time from successful endotracheal intubation to return of spontaneous breathing in minutes