

AIM OF THE WORK

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The present study was designed to compare orally administered ketamine and orally administered dexmedetomidine as a sedative premedication in children undergoing outpatient dental surgery under general anesthesia as regards:

1. Sedative effect
2. Reaction to separation from the parents
3. Ease of venipuncture
4. Recovery
5. Discharge times
6. Postoperative amnesia.

PATIENTS

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This study was carried out on 80 ASA I and II patients aged between 4 and 6 years admitted to Department of paediatric dentistry, Alexandria Main University Hospital, scheduled for elective out-patient dental surgery under general anesthesia.

Sample size was statistically approved by the biostatistics department of the High Institute of Public Health, Alexandria University.

Exclusion criteria

Patients suffering from

- Cardiac disease.
- Neuromuscular disease.
- Pulmonary disease (e.g. asthma).
- Anticipated difficult airway.
- Any condition with increased risk of regurgitation and aspiration of gastric contents.
- Patients suffering from pharyngeal pathology e.g. abscess and haematoma.
- known allergy or hypersensitivity reaction to any of the study drugs.

METHODS

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After approval of Medical Ethics Committee of the Faculty of Medicine and taking an informed written consent from the parents, every patient was subjected to a careful pre-anesthetic assessment including:

Pre-operative evaluation

- History of medical illness and drugs.
- Complete physical examination.
- Routine laboratory investigation: Complete blood count, bleeding time, clotting time, prothrombin time, partial thromboplastin time and International normalized ratio.

Pre-medication

- Children were randomly allocated to one of the two equal study groups using computer-generated random numbers.
 - I. Group K: received 5 mg/kg oral ketamine.⁽⁶²⁾
 - II. Group D: received oral dexmedetomidine 3 µg/kg.⁽⁶³⁾ Both oral premedications were diluted in 3 ml of apple juice given thirty minutes before induction of anaesthesia.
- Children were given premedication in the preoperative holding area in the presence of one parent.
- Emla cream was applied to the place of possible venipuncture.

Monitoring

- All patients in the operating theater were connected to multichannel monitor (Trakmon-Kontron-Limited- England) for display of:
 - Non invasive blood pressure.
 - HR and lead II ECG
 - Oxygen saturation.

Anaesthesia

- On arrival to operating room, an intravenous cannula was inserted.
- All patients were subjected to the same anaesthetic protocol

A. Induction

Atropine (0.02mg/kg IV) followed by propofol (2-3 mg/kg IV) Endotracheal intubation was facilitated by atracurium(0.5mg/kg IV).

Intra-operative analgesia was maintained by ketorolac (0.5mg/kg IV)

B. Maintenance

Anesthesia was maintained by isoflurane (1-2%) in 100% oxygen. Ventilation was mechanically controlled. Atracurium increments was given as required.

C. Recovery

At the end of the procedure isoflurane was discontinued. Neuromuscular block was antagonized by neostigmine (0.04mg/kg IV) and atropine (0.02mg /kg IV). Children were extubated after return of protective reflexes.

D. Discharge

Children were discharged home on meeting discharge criteria.⁽⁶⁴⁾

Measurements

1. Demographic data

Age, sex and weight

2. Duration of surgery in minutes

3. Vital signs

- Heart rate (beats/min).
- Mean arterial blood pressure (mmHg).
- Oxygen saturation percentage (SaO₂%).

Were recorded at the following times:

- Base line (before sedation).
- Before induction of general anesthesia (30 min after sedation).
- During the procedure: Every 15 min.
- Post-operative: Every 30 min till discharge

4. Assessment of sedation⁽⁶⁵⁾

Was recorded after admission to OR (30 min after sedation) was using sedative score:

1	Sleeping, no response to patting the shoulder.
2	Sleeping, no response to call. Responds to patting on the shoulder.
3	Eyes closed, dull reaction. Responds to verbal stimulus.
4	Eyes open and closed by turns, dull reaction. Responds to verbal stimulus.
5	Eyes open, dull reaction. Responds to verbal stimulus.
6	Normal reaction.
7	Irritable with body movement.

5. Assessment of ease of Separation and venipuncture

Was graded according to Ease of Induction Score System⁽⁶⁶⁾

1	Excellent	Patient unafraid, cooperative or asleep.
2	Good	Slight fear and/or crying, quiet with reassurance.
3	Fair	Moderate fear and crying, not quiet with reassurance.
4	Poor	Crying, need for restraint.

6. Assessment of recovery

Was assessed as base line then postoperative every 10 min till baseline score regained, using "Vancouver sedative recovery scale for children".⁽⁶⁷⁾ Recovery time from discontinuation of anesthesia till regaining baseline score was recorded.

	Parameter	Finding	Points
(A)	Awake-asleep	Awake and alert.	4
		Awake but drowsy.	3
		Asleep but easily aroused.	2
		Asleep and difficult to arouse.	1
		Asleep and unable to arouse.	0
(B)	Response to stimuli	Responds fully to stimuli.	2
		Delayed response to stimuli.	1
		Absent response to stimuli.	0
(C)	Facial expression	Alert.	1
		Flat.	0
(D)	Appearance of eyes	Bright eyes.	1
		Dull eyes; glazed.	0
(E)	Feeling how looks at you	Looks "at you"	1
		Looks "through you"	0
(F)	Visual stimulus	Recognition of stimulus.	1
		Limited or no recognition of stimulus.	0
(G)	Eye movement	Purposeful and spontaneous.	1
		Little or no spontaneous or purposeful movement.	0
(H)	Activity	Spontaneous & varied central activity.	4
		Spontaneous & varied peripheral activity.	3
		Central activity in response to stimuli.	2
		Peripheral activity in response to stimuli.	1
		No movement.	0
(I)	Tremor or ataxia	Absence of tremor or ataxia.	1
		Ataxia or tremor on being moved.	0
(J)	Spontaneous movement	Coordinated spontaneous movement.	2
		Weak/coarse spontaneous movement.	1
		No purposeful spontaneous movement.	0
(K)	Hand movements	Age-appropriate manual dexterity.	2
		Awkward or clumsy hand movement.	1
		No fine hand movement.	0

7. Discharge time

Discharge time from discontinuation of anesthesia until the patient is discharged to home, using "The Short-Stay Surgery Discharge Score"⁽⁶⁸⁾ was recorded (A score of 10-12 was needed for discharge).

Parameter	Finding	Points
Temperature	Severe chills and/or increased perspiration.	0
	Oral temperature >38°C or < 36°C.	1
	Oral temperature 36-38°C.	2
Circulation	Blood pressure and heart rate changed more than 20 % from preoperative values.	0
	Standing blood pressure < supine blood pressure. Pulse increases >10 beats/min when standing.	1
	Standing blood pressure about the same as supine. Pulse increase < 10 beats/min when standing.	2
Activity	Unable to ambulate, sleepy.	0
	Out of bed with assistance.	1
	Out of bed without assistance and able to states discharge instructions.	2
Pain	Needs pain medicine administered IM.	0
	Needs pain medicine administered PO.	1
	Free of pain.	2
Bleeding	Large amount of surgical bleeding.	0
	Moderate amount of surgical bleeding.	1
	No surgical bleeding and no hematoma.	2
Intake Output	No PO fluids; unable to void.	0
	PO ice chips, sips fluids; voids into urinal.	1
	PO fluids without nausea or vomiting for 1 hour; voids quantity sufficient in bathroom.	2

8. Assessment of amnesia

The anterograde amnesia was assessed after 24 hours by a recall questionnaire of the parents, which included the questions about events which took place after the administration of sedative.⁽⁶⁹⁾

RESULTS

RESULTS

This study was carried out on eighty children of both sexes. They were operated upon for minor dental surgeries under general anesthesia. The age ranged between 4 and 6 years. All the patients were with good physical status (ASA I). They were randomly classified into two equal groups; forty each using the closed opaque envelope method.

The results of the present study showed:

Patient's demographic data: (Table1,2,3) (figures 1,2,3,4)

Group K

The age of the patients ranged from 4 to 6 years, with a mean of 4.91 ± 0.62 years. The weight of the patients ranged between 16 and 28 kg, with a mean of 21.15 ± 3.22 kg. Thirty one patients were males (77.5%) and nine patients were females (22.5%). The duration of the operation ranged between 30 and 90 min, with a mean of 71.45 ± 16.23 min.

Group D

The age of the patients ranged from 4.1 to 6 years, with a mean of 4.98 ± 0.53 years. The weight of the patients ranged between 16 and 27 kg with a mean of 20.85 ± 3.02 kg. Thirty one patients were males (77.5%) and nine patients were females (22.5%). The duration of the operation ranged between 30 and 90 min, with a mean of 69.13 ± 17.24 min.

Comparison between both groups

There was no statistically significant difference between both groups as regard the patient's ages (P value = 0.552), their gender distribution (P value = 1.000), their weights (P value = 0.669) and the duration of operation (P value = 0.536).

Table (1): Comparison between the two studied groups according to age and weight.

	Age		Weight	
	Group K	Group D	Group K	Group D
1	4.2	4.5	18	24
2	4.5	4.8	21	18
3	5.5	5.8	16	22
4	5.7	6.0	18	27
5	5.0	5.3	20	25
6	5.0	5.3	24	20
7	4.0	5.0	18	20
8	4.9	4.7	22	22
9	5.0	4.8	27	18
10	5.1	4.9	25	24
11	6.0	5.8	20	26
12	4.0	4.1	20	16
13	5.3	5.2	21	17
14	4.7	4.6	17	18
15	5.3	5.2	22	25
16	5.2	5.1	18	20
17	5.0	4.9	24	22
18	4.9	4.8	26	25
19	4.8	4.7	22	24
20	4.3	4.2	21	18
21	5.0	5.2	22	22
22	5.4	5.6	23	19
23	5.0	5.2	28	18
24	4.0	4.2	26	23
25	4.0	4.2	23	18
26	4.3	4.5	16	21
27	4.2	4.4	17	16
28	4.0	4.2	18	18
29	5.0	5.2	25	20
30	5.7	5.4	20	24
31	4.9	4.6	22	18
32	6.0	5.7	21	20
33	6.0	5.7	25	20
34	4.0	4.7	24	21
35	4.5	4.2	18	17
36	5.5	5.2	22	25
37	5.3	5.0	19	24
38	5.2	4.9	18	18
39	5.8	5.5	23	22
40	4.0	6.0	16	19
Min. – Max.	4.0 – 6.0	4.10 – 6.0	16.0 – 28.0	16.0 – 27.0
Mean ± SD.	4.91 ± 0.62	4.98 ± 0.53	21.15 ± 3.22	20.85 ± 3.02
t	0.597		0.430	
p	0.552		0.669	

t: Student t-test

Table (2): Comparison between the two studied groups according to sex.

	Sex	
	Group K	Group D
1	Male	Female
2	Male	Male
3	Male	Male
4	Male	Male
5	Female	Male
6	Male	Female
7	Male	Male
8	Male	Male
9	Male	Female
10	Female	Male
11	Male	Male
12	Male	Male
13	Male	Male
14	Male	Female
15	Male	Male
16	Male	Male
17	Female	Male
18	Male	Male
19	Female	Male
720	Male	Male
21	Male	Male
22	Male	Male
23	Female	Male
24	Male	Male
25	Male	Female
26	Male	Male
27	Male	Male
28	Male	Male
29	Female	Male
30	Male	Female
31	Male	Male
32	Male	Male
33	Female	Female
34	Female	Male
35	Female	Male
36	Male	Male
37	Male	Female
38	Male	Male
39	Male	Female
40	Male	Male
Male	31 (77.5%)	31 (77.5%)
Female	9 (22.5%)	9 (22.5%)
χ^2	0.0	
p	1.000	

χ^2 : Chi square test

Table (3): Comparison between the two studied groups according to duration of surgery.

	Duration of surgery	
	Group K	Group D
1	90	65
2	85	80
3	65	75
4	80	55
5	60	85
6	90	70
7	80	79
8	55	82
9	85	55
10	30	77
11	50	68
12	65	77
13	90	80
14	55	70
15	40	77
16	80	82
17	77	30
18	88	90
19	80	50
20	45	38
21	80	90
22	75	55
23	87	40
24	35	80
25	79	77
26	80	88
27	70	80
28	80	45
29	60	80
30	90	75
31	76	85
32	55	65
33	87	80
34	70	60
35	80	90
36	80	80
37	55	55
38	75	85
39	65	30
40	89	40
Min. – Max.	30.0 – 90.0	30.0 – 90.0
Mean ± SD.	71.45 ± 16.23	69.13 ± 17.24
t	0.621	
p	0.536	

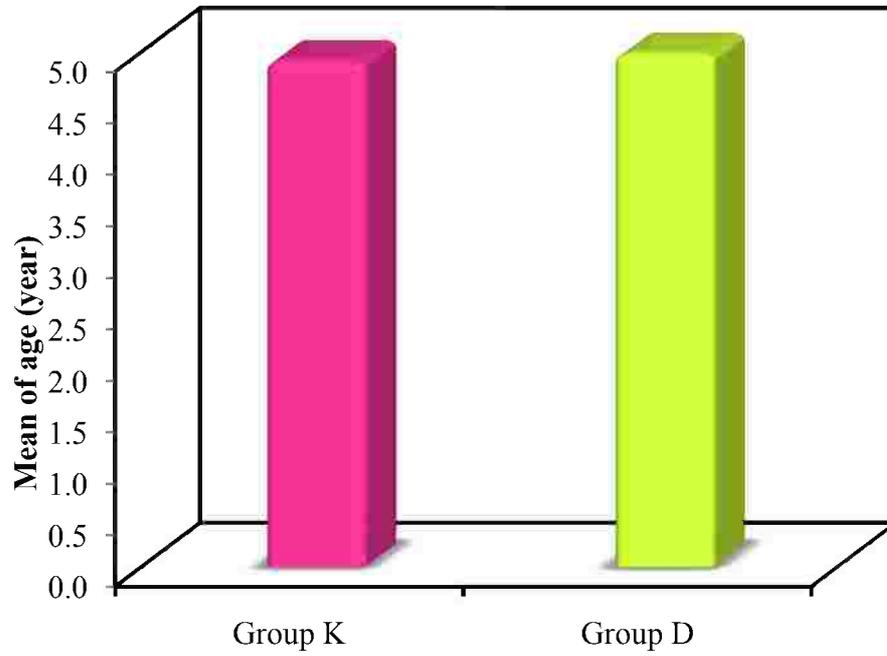


Fig. (1): Comparison between the two studied groups regarding age.

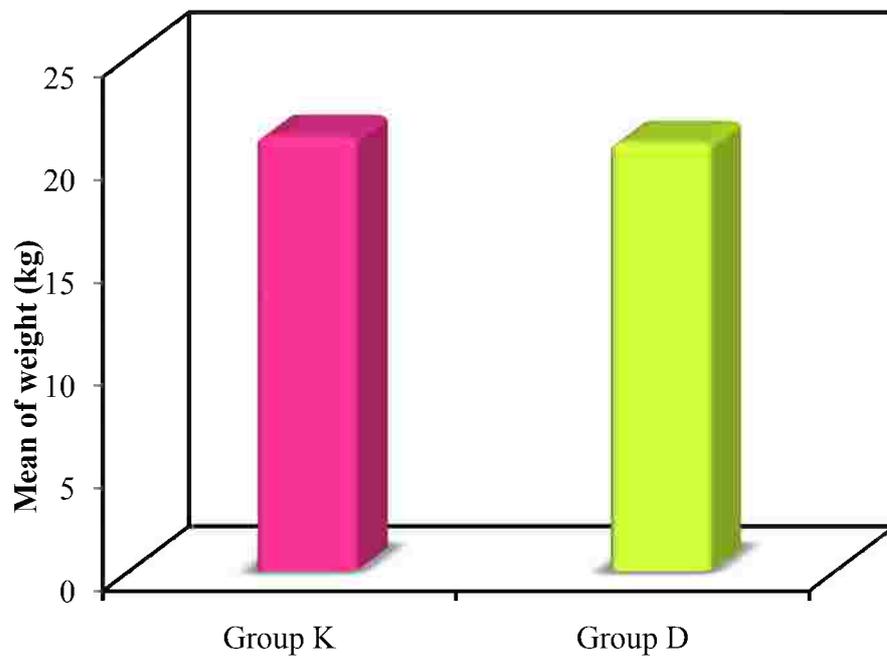


Fig. (2): Comparison between the two studied groups regarding weight.

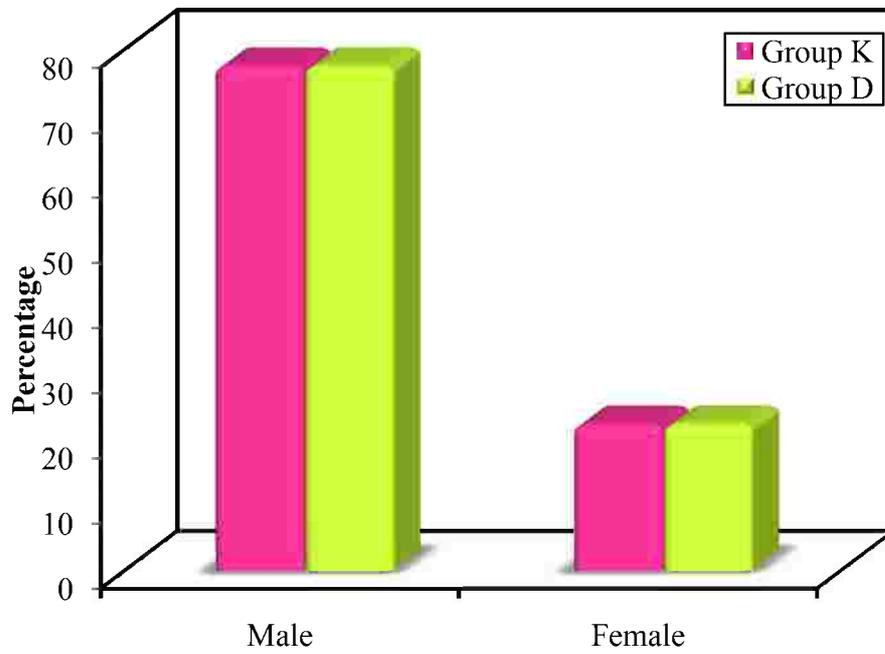


Fig. (3): Comparison between the two studied groups regarding sex.

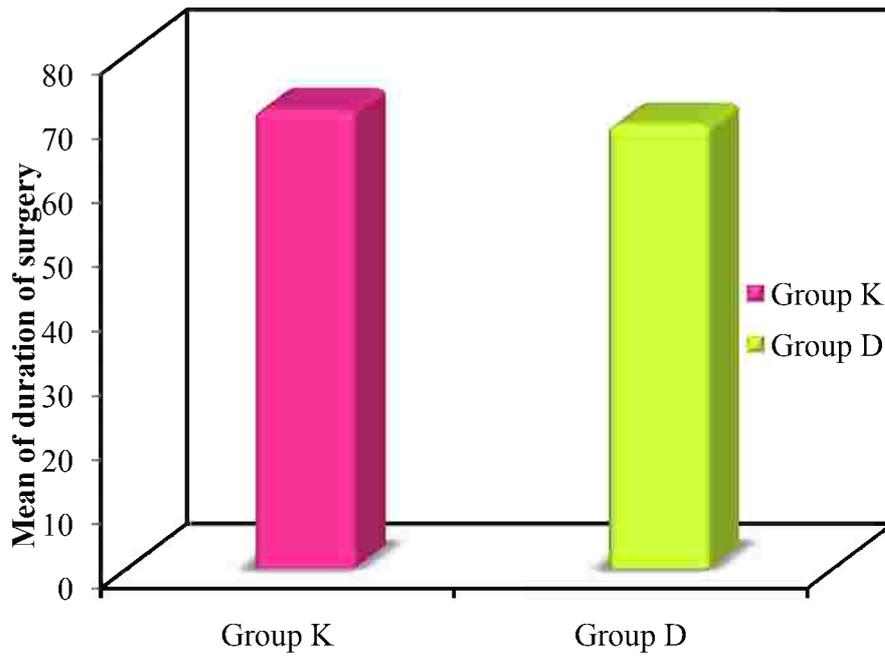


Fig. (4): Comparison between the two studied groups regarding duration of surgery.

Hemodynamic measurements

Changes in the heart rate (beats/min). (Table 4, 5, 6) (figures 5)

Group K

i. Before sedation

The base-line value (before sedation) ranged from 90 to 128 beats/min, with a mean of 108.8 ± 10.79 beats/min.

ii. After sedation, before induction

At 30 min after sedation, it ranged from 86 to 128 beats/min, with a mean of 109.9 ± 12.02 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.6)

iii. Intra-operative

At 0 min it ranged from 86 to 129 beats/min, with a mean of 109.73 ± 12.34 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.68)

At 15 min it ranged from 84 to 129 beats/min, with a mean of 108.38 ± 12.12 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.812)

At 30 min it ranged from 85 to 127 beats/min, with a mean of 104.05 ± 13.23 beats/min. There was a statistically significant difference when compared to baseline (P value = 0.04)

At 45 min it ranged from 84 to 127 beats/min, with a mean of 103.76 ± 13.78 beats/min. There was a statistically significant difference when compared to baseline (P value = 0.03)

At 60 min it ranged from 82 to 129 beats/min, with a mean of 102.72 ± 15.33 beats/min. There was a statistically significant difference when compared to baseline (P value = 0.002)

At 75 min it ranged from 85 to 129 beats/min, with a mean of 104.71 ± 15.63 beats/min. There was a statistically significant difference when compared to baseline (P value = 0.031)

At 90 min it ranged from 84 to 125 beats/min, with a mean of 98.5 ± 18.16 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.2)

iv. Postoperative

At 0min it ranged from 90 to 128 beats/min, with a mean of 110.13 ± 9.84 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.64)

At 30min it ranged from 88 to 128 beats/min, with a mean of 110.43 ± 10.79 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.52)

At 60min it ranged from 86 to 128 beats/min, with a mean of 108.84 ± 11.11 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.8)

At 90min it ranged from 100 to 118 beats/min, with a mean of 107 ± 9.64 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.9)

Group D

i. Before sedation

The base-line value (before sedation) ranged from 90 to 129 beats/min, with a mean of 110.28 ± 9.48 beats/min.

ii. After sedation, before induction

At 30 min after sedation it ranged from 90 to 123 beats/min, with a mean of 104.27 ± 9.34 beats/min. There was a statistically significant difference when compared to baseline (P value = <0.001)

iii. Intra-operative

At 0 min it ranged from 92 to 123 beats/min, with a mean of 109.5 ± 9.19 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.67).

At 15 min it ranged from 92 to 129 beats/min, with a mean of 108.13 ± 9.13 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.19).

At 30 min it ranged from 92 to 129 beats/min, with a mean of 108.2 ± 9.13 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.299).

At 45 min it ranged from 93 to 124 beats/min, with a mean of 106.71 ± 8.67 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.071).

At 60 min it ranged from 92 to 126 beats/min, with a mean of 105.69 ± 9.14 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.06).

At 75 min it ranged from 93 to 122 beats/min, with a mean of 104.87 ± 9.43 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.172).

At 90 min it ranged from 98 to 101 beats/min, with a mean of 99.5 ± 2.12 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.275).

iv. Postoperative

At 0min it ranged from 89 to 120 beats/min, with a mean of 104.72 ± 10.98 beats/min. There was a statistically significant difference when compared to baseline (P value = 0.018).

At 30min it ranged from 91 to 119 beats/min, with a mean of 104.8 ± 9.6 beats/min. There was a statistically significant difference when compared to baseline (P value = 0.023).

At 60min it ranged from 90 to 125 beats/min, with a mean of 109.08 ± 8.77 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.691).

At 90min it ranged from 106 to 118 beats/min, with a mean of 113.67 ± 6.66 beats/min. There was no statistically significant difference when compared to baseline (P value = 0.613).

At 120min the reading was 115 beats/min.

Comparison between both groups

There was no significant difference as regards the heart rate before sedation "base line" (P value = 0.539).

There was a significant difference at 30 min after sedation (P value = 0.022)

There was no significant difference intra-operative at 0 min (P value = 0.951), at 15 min (P value = 0.917), 30 min (P value = 0.111), 45 min (P value = 0.274), 60 min (P value = 0.357), 75 min (P value = 0.966), 90 min (P value = 0.945).

There was a significant difference post-operative at 0 min (P value = 0.023), 30 min (P value = 0.016).

There was no significant difference post-operative at 60 min (P value = 0.923), 90 min (P value = 0.38).

Table (4): Descriptive of the studied cases according to heart rate in group K.

	Baseline	Before induction	During the procedure							Post-operative			
			0 min	15 min	30 min	45 min	60 min	75 min	90min	0 min	30 min	60 min	90min
1	122	118	116	110	100	100	129	127	125	110	116	116	.
2	120	116	116	116	110	105	125	122	.	105	109	106	.
3	115	111	109	106	90	89	88	.	.	105	100	.	.
4	110	102	100	95	110	105	100	100	.	120	102	100	.
5	120	112	110	105	110	105	105	.	.	100	105	105	.
6	105	102	100	96	120	120	95	94	94	115	119	118	.
7	110	105	105	104	100	99	95	90	.	100	119	118	.
8	100	119	118	117	106	104	.	.	.	100	125	120	.
9	100	119	118	118	127	126	125	117	.	114	88	86	.
10	100	125	120	120	90	87	.	.	.	118	128	128	.
11	90	88	86	86	90	88	86	.	.	125	102	.	.
12	102	128	128	126	90	88	86	.	.	121	109	.	.
13	92	90	92	89	90	88	86	85	84	118	126	90	.
14	100	124	120	120	120	120	.	.	.	110	89	90	.
15	110	105	102	100	92	.	.	.	.	120	120	120	.
16	106	102	100	100	100	100	96	94	.	100	100	92	.
17	102	128	126	126	120	118	116	114	.	110	100	100	.
18	120	120	122	118	115	114	111	109	.	120	126	120	.
19	109	100	100	98	112	120	120	110	.	105	112	.	.
20	100	122	122	121	125	125	.	.	.	95	126	120	.
21	120	110	110	112	127	127	124	127	.	115	118	115	.
22	118	114	115	114	121	121	116	117	.	100	98	112	.
23	110	104	100	100	87	87	88	91	.	100	104	100	100
24	105	95	95	96	98	.	.	.	.	118	103	.	.
25	115	105	103	103	121	121	118	121	.	128	96	.	.
26	102	95	96	96	93	95	90	93	.	108	109	105	.
27	108	103	102	100	93	93	92	.	.	103	120	115	.
28	125	116	116	116	103	102	127	129	.	100	118	115	.
29	125	120	118	116	115	114	110	.	.	110	110	103	.
30	125	116	118	116	85	84	83	87	91	110	120	118	.
31	90	86	86	84	87	89	86	85	.	125	117	109	.
32	100	126	124	122	87	89	.	.	.	120	93	90	.
33	90	88	86	90	87	85	82	87	.	122	105	100	.
34	126	120	119	118	111	103	100	.	.	120	106	.	.
35	108	100	100	98	88	90	88	89	.	120	120	119	118
36	102	101	129	129	97	95	92	95	.	95	110	112	.
37	100	124	126	120	113	111	.	.	.	110	120	121	.
38	120	120	121	118	107	103	100	103	.	100	113	113	.
39	105	99	98	98	111	108	106	.	.	100	118	107	103
40	128	118	117	118	114	125	122	127	.	90	98	.	.
Min.	90.0	86.0	86.0	84.0	85.0	84.0	82.0	85.0	84.0	90.0	88.0	86.0	100.0
Max.	128.0	128.0	129.0	129.0	127.0	127.0	129.0	129.0	125.0	128.0	128.0	128.0	118.0
Mean	108.88	109.90	109.73	108.38	104.05	103.76	102.72	104.71	98.50	110.13	110.43	108.84	107.0
SD	10.79	12.02	12.34	12.12	13.23	13.78	15.33	15.63	18.16	9.84	10.79	11.11	9.64
p		0.609	0.684	0.812	0.040*	0.039*	0.002*	0.031*	0.206	0.640	0.526	0.806	0.919

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 (5): Descriptive of the studied cases according to heart rate in group D.

	Baseline	Before induction	During the procedure							Post-operative				
			0 min	15 min	30 min	45 min	60 min	75 min	90min	0 min	30 min	60 min	90min	120 min
1	120	115	110	110	108	107	107	.	.	115	109	108	.	.
2	105	100	102	100	99	98	98	96	.	100	118	117	.	.
3	105	100	102	100	100	102	99	98	.	100	104	104	.	.
4	120	118	119	120	118	115	.	.	.	118	91	118	.	.
5	100	90	127	129	125	122	126	122	.	89	105	105	.	.
6	110	108	110	107	105	100	98	.	.	108	91	118	.	.
7	105	103	104	100	95	98	95	93	.	103	119	120	118	115
8	100	100	128	125	123	120	118	118	.	100	116	106	.	.
9	112	110	110	108	106	105	.	.	.	110	110	110	.	.
10	113	110	112	110	109	108	108	109	.	110	96	97	.	.
11	125	90	119	118	118	117	116	.	.	89	104	103	117	.
12	124	90	118	113	104	104	103	107	.	120	117	120	.	.
13	118	122	120	120	120	118	118	116	.	89	112	.	.	.
14	110	114	110	105	105	105	108	.	.	120	116	.	.	.
15	100	100	128	122	120	118	117	120	.	120	111	110	.	.
16	100	95	95	94	94	94	96	96	.	95	112	114	.	.
17	110	110	100	100	100	.	.	.	.	110	91	116	.	.
18	100	100	105	102	120	119	118	118	.	100	113	115	.	.
19	100	100	105	102	120	119	.	.	.	100	101	103	.	.
20	90	90	92	92	92	.	.	.	.	115	91	90	.	.
21	120	110	116	116	106	104	100	100	101	105	96	95	.	.
22	110	110	111	110	110	104	.	.	.	95	104	105	.	.
23	105	95	96	96	97	.	.	.	.	89	101	101	.	.
24	100	90	94	94	94	93	92	93	.	89	106	104	.	.
25	115	110	106	106	104	102	100	100	.	108	105	.	.	.
26	118	100	116	111	111	105	100	100	.	104	91	110	.	.
27	113	100	100	100	100	99	99	99	.	89	115	110	.	.
28	120	110	101	101	101	99	.	.	.	107	102	100	.	.
29	110	100	106	106	104	101	102	102	.	109	101	99	.	.
30	100	95	99	96	95	93	93	93	.	120	110	106	106	.
31	102	110	106	106	106	102	103	103	.	118	114	110	.	.
32	128	120	105	104	103	102	101	.	.	110	118	110	.	.
33	125	123	116	116	114	112	110	106	.	120	91	125	.	.
34	107	110	114	114	113	109	111	.	.	117	91	120	.	.
35	105	100	109	109	106	99	99	100	98	93	118	122	.	.
36	100	90	106	101	129	124	120	118	.	105	110	120	.	.
37	108	105	116	114	111	108	.	.	.	120	91	120	.	.
38	129	109	116	118	116	110	110	105	.	89	100	95	.	.
39	109	105	113	111	109	.	.	.	.	89	110	110	.	.
40	120	114	121	119	118	.	.	.	.	102	91	100	.	.
Min.	90.0	90.0	92.0	92.0	92.0	93.0	92.0	93.0	98.0	89.0	91.0	90.0	106.0	115.0
Max.	129.0	123.0	128.0	129.0	129.0	124.0	126.0	122.0	101.0	120.0	119.0	125.0	118.0	
Mean	110.28	104.27	109.58	108.13	108.20	106.71	105.69	104.87	99.50	104.72	104.80	109.08	113.67	
SD	9.48	9.34	9.19	9.13	9.49	8.67	9.14	9.43	2.12	10.98	9.60	8.77	6.66	
p		<0.001*	0.679	0.190	0.299	0.071	0.060	0.172	0.275	0.018*	0.023*	0.691	0.613	-

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 (6): Comparison between the studied groups according to heart rate

	Baseline	Before induction	During the procedure							Post-operative				
			0 min	15 min	30 min	45 min	60 min	75 min	90 min	0 min	30 min	60 min	90 min	120 min
Group K														
Min.	90.0	86.0	86.0	84.0	85.0	84.0	82.0	85.0	84.0	90.0	88.0	86.0	100.0	-
Max.	128.0	128.0	129.0	129.0	127.0	127.0	129.0	129.0	125.0	128.0	128.0	128.0	118.0	-
Mean	108.88	109.90	109.73	108.38	104.05	103.76	102.72	104.71	98.50	110.13	110.43	108.84	107.0	-
SD	10.79	12.02	12.34	12.12	13.23	13.78	15.33	15.63	18.16	9.84	10.79	11.11	9.64	-
Group D														
Min.	90.0	90.0	92.0	92.0	92.0	93.0	92.0	93.0	98.0	89.0	91.0	90.0	106.0	115.0
Max.	129.0	123.0	128.0	129.0	129.0	124.0	126.0	122.0	101.0	120.0	119.0	125.0	118.0	
Mean	110.28	104.27	109.58	108.13	108.20	106.71	105.69	104.87	99.50	104.72	104.80	109.08	113.67	
SD	9.48	9.34	9.19	9.13	9.49	8.67	9.14	9.43	2.12	10.98	9.60	8.77	6.66	
t	0.616	2.338*	0.062	0.104	1.612	1.104	0.929	0.043	0.073	2.317*	2.463*	0.097	0.985	
p	0.539	0.022*	0.951	0.917	0.111	0.274	0.357	0.966	0.945	0.023*	0.016*	0.923	0.380	-

t: Student t-test

*: Statistically significant at $p \leq 0.05$

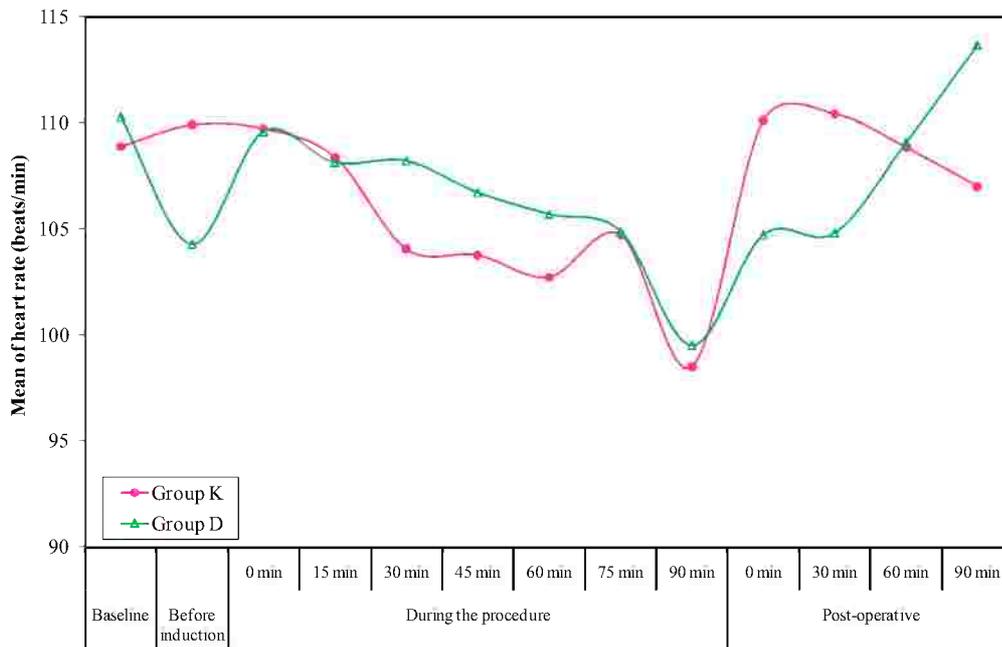


Fig. (5): Comparison between the two studied groups regarding heart rate.

Changes in the mean arterial blood pressure (mmHg). (Table 7,8,9) (figure 8)

Group K

i. Before sedation

The base-line value (before sedation) ranged from 59 to 80 mmHg, with a mean of 69.05 ± 6.06 mmHg.

ii. After sedation, before induction

At 30 min after sedation it ranged from 58 to 79 mmHg, with a mean of 68.38 ± 6.05 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

iii. Intra-operative

At 0min it ranged from 57 to 77 mmHg, with a mean of 66.42 ± 5.87 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 15min it ranged from 56 to 75 mmHg, with a mean of 65.62 ± 5.66 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 30min it ranged from 55 to 76 mmHg, with a mean of 64.9 ± 5.85 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 45min it ranged from 56 to 76 mmHg, with a mean of 65.43 ± 6.12 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 60min it ranged from 56 to 76 mmHg, with a mean of 64.74 ± 6.06 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 75min it ranged from 54 to 77 mmHg, with a mean of 64.5 ± 6.67 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 90min it ranged from 55 to 75 mmHg, with a mean of 66 ± 8.87 mmHg. There was a statistically significant difference when compared to baseline (P value $=0.023$).

iv. Postoperative

At 0 min it ranged from 59 to 75 mmHg, with a mean of 65.6 ± 4.18 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 30 min it ranged from 56 to 75 mmHg, with a mean of 64.22 ± 4.45 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 60 min it ranged from 60 to 82 mmHg, with a mean of 70.28 ± 6.1 mmHg. There was no statistically significant difference when compared to baseline (P value $=0.288$).

At 90 min it ranged from 63 to 87 mmHg, with a mean of 72.67 ± 12.66 mmHg. There was no statistically significant difference when compared to baseline (P value $=0.293$).

Group D

i. Before sedation

The base-line value (before sedation) ranged from 59 to 79 mmHg, with a mean of 66.6 ± 5.63 mmHg.

ii. After sedation, before induction

At 30 min after sedation it ranged from 57 to 77 mmHg, with a mean of 65.2 ± 5.64 mmHg. There was a statistically significant difference when compared to baseline (P value =0.001).

iii. Intra-operative

At 0min it ranged from 56 to 76 mmHg, with a mean of 64.7 ± 5.37 mmHg. There was a statistically significant difference when compared to the base line (P value < 0.001).

At 15min it ranged from 56 to 76 mmHg, with a mean of 63.28 ± 5.22 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 30 min it ranged from 56 to 77 mmHg, with a mean of 62.98 ± 5.26 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 45 min it ranged from 56 to 76 mmHg, with a mean of 63 ± 5.2 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 60 min it ranged from 55 to 76 mmHg, with a mean of 62.93 ± 5.2 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 75 min it ranged from 57 to 74 mmHg, with a mean of 63.78 ± 5.01 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 90 min it ranged from 60 to 61 mmHg, with a mean of 60.5 ± 0.71 mmHg. There was a statistically significant difference when compared to baseline (P value =0.5).

iv. Postoperative

At 0 min it ranged from 58 to 73 mmHg, with a mean of 62.12 ± 3.41 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001)..

At 30 min it ranged from 58 to 72 mmHg, with a mean of 61.5 ± 3.24 mmHg. There was a statistically significant difference when compared to baseline (P value <0.001).

At 60 min it ranged from 60 to 77 mmHg, with a mean of 65.92 ± 4.75 mmHg. There was no statistically significant difference when compared to baseline (P value =0.605).

At 90 min it ranged from 66 to 70 mmHg, with a mean of 67.67 ± 2.08 mmHg. There was no statistically significant difference when compared to baseline (P value=0.287).

At 120 min the reading was 65 mmHg.

Comparison between both groups

There was no significant difference as regards mean arterial blood pressure before sedation "base line" (P value = 0.065).

There was significant difference at 30 min after sedation (P value= 0.017).

There was no significant difference intra-operative at 0 min (P value = 0.174), 15 min (P value = 0.057), 30 min (P value = 0.126), 45 min (P value = 0.074), 60 min (P value = 0.221), 75 min (P value = 0.680), 90 min (P value = 0.455)

There was significant difference as regards mean arterial blood pressure post-operative at 0 min (P value < 0.001), 30 min (P value =0.002), 60 min (P value = 0.001).

Table (7): Descriptive of the studied cases according to mean arterial blood pressure in group K.

	Baseline	Before induction	During the procedure							Post-operative			
			0 min	15 min	30 min	45 min	60 min	75 min	90min	0 min	30 min	60 min	90min
1	62	61	60	58	56	56	57	56	55	60	59	60	
2	69	69	65	64	63	63	62	65		72	74	66	
3	68	67	65	64	64	63	63			66	67		
4	71	70	68	66	65	67	66	65		62	67	70	
5	70	70	67	68	66	67	65			68	64	65	
6	75	74	74	72	73	72	72	73	71	75	75	68	
7	72	72	70	69	68	69	69	67		69	64	66	
8	64	63	62	61	59	61				62	65	62	
9	59	58	57	56	57	58	56	56		68	67	66	
10	75	74	71	70	68					70	64	66	
11	77	76	74	75	74	74				66	66		
12	75	74	71	70	71	72	72			59	61		
13	80	79	77	75	76	75	76	77	75	72	75	70	
14	71	71	70	68	67	68				64	63	79	
15	67	66	64	64	63					63	62	79	
16	75	74	74	72	73	72	71	71		61	65	67	
17	63	62	60	61	60	59	58	59		65	66	66	
18	62	61	59	58	58	57	58	57		66	62	62	
19	79	78	77	75	76	76	75	74		63	61		
20	74	74	70	69	67	68				68	69	65	
21	59	58	58	56	55	56	56	54		59	56	75	
22	76	77	74	74	75	74	72	73		73	72	72	
23	67	66	64	64	61	63	61	61		65	62	80	87
24	69	68	65	66	64					66	65		
25	68	67	64	66	64	66	64	63		64	62		
26	77	76	75	73	71	74	72	73		73	70	75	
27	79	78	76	73	72	75	74			63	62	69	
28	67	66	64	64	63	63	63	61		64	64	68	
29	68	67	64	65	63	65	63			68	65	68	
30	65	65	64	63	63	63	63	64	63	64	62	70	
31	66	66	63	64	62	62	62	63		65	61	69	
32	59	59	58	56	58	58				60	57	69	
33	79	78	75	73	72	74	72	73		73	65	80	
34	63	62	60	59	58	60	60			61	59		
35	64	63	63	60	58	60	59	58		63	62	79	68
36	67	66	64	64	63	63	63	61		67	64	82	
37	65	64	62	62	63	64				65	61	76	
38	69	68	65	65	64	64	62	63		65	62	63	
39	62	62	60	59	60	58	58			60	58	77	63
40	65	66	64	64	63	62	63	61		67	64		
Min.	59.0	58.0	57.0	56.0	55.0	56.0	56.0	54.0	55.0	59.0	56.0	60.0	63.0
Max.	80.0	79.0	77.0	75.0	76.0	76.0	76.0	77.0	75.0	75.0	75.0	82.0	87.0
Mean	69.05	68.38	66.42	65.62	64.90	65.43	64.74	64.50	66.0	65.60	64.22	70.28	72.67
SD	6.06	6.05	5.87	5.66	5.85	6.12	6.06	6.67	8.87	4.18	4.45	6.10	12.66
p		<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	0.023*	<0.001*	<0.001*	0.288	0.293

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): Descriptive of the studied cases according to mean arterial blood pressure in group D.

	Baseline	Before induction	During the procedure							Post-operative				
			0 min	15 min	30 min	45 min	60 min	75 min	90min	0 min	30 min	60 min	90min	120min
1	59	57	56	57	56	56	56			58	58	66		
2	59	57	56	56	56	56	56	57		73	72	67		
3	66	64	63	62	64	64	62	62		61	60	64		
4	68	66	62	65	64	64				64	63	68		
5	65	63	63	64	62	64	64	63		61	61	65		
6	72	70	70	69	67	66	66			68	66	68		
7	75	72	71	70	68	68	65	68		62	62	72	70	65
8	60	58	57	56	57	58	55	57		63	62	66		
9	61	59	59	58	59	58				63	61	70		
10	79	77	76	76	77	76	76	74		61	60	70		
11	66	63	63	62	60	62	60			61	61	72	67	
12	71	70	68	67	67	68	68	69		59	58	62		
13	76	73	72	73	72	72	72	73		64	63			
14	60	59	58	59	57	59	56			60	59			
15	78	76	75	74	76	75	75	73		61	61	60		
16	76	73	71	70	71	70	68	69		64	63	64		
17	62	59	59	60	58					60	58	64		
18	67	65	65	64	63	64	63	62		61	59	65		
19	63	60	59	58	59	58				59	58	63		
20	62	61	60	58	57					66	64	70		
21	60	58	59	56	58	58	58	59	60	58	59	75		
22	72	74	73	72	73	72				73	72	75		
23	66	66	65	62	61					60	60	61		
24	62	67	66	65	64	63	62	62		62	62	64		
25	68	63	64	62	61	61	62	60		62	60			
26	75	75	73	70	68	66	65	65		65	65	70		
27	69	63	63	62	62	62	62	63		62	63	77		
28	62	65	64	64	63	62				59	59	60		
29	68	66	68	65	63	61	62	60		62	60	69		
30	70	64	64	62	61	60	61	60		61	60	67	66	
31	66	65	65	61	61	61	62	61		62	61	60		
32	59	61	60	57	59	58	59			59	58	60		
33	72	74	73	65	64	63	63	64		63	64	65		
34	64	63	61	59	60	59	61			61	61	70		
35	63	61	63	62	61	61	62	62	61	62	62	65		
36	61	65	67	64	64	63	65	65		65	65	60		
37	65	65	65	61	60	58				59	59	60		
38	66	62	65	62	61	59	59	59		59	59	65		
39	63	60	60	58	59					58	59	60		
40	68	69	67	64	66					64	63	60		
Min.	59.0	57.0	56.0	56.0	56.0	56.0	55.0	57.0	60.0	58.0	58.0	60.0	66.0	
Max.	79.0	77.0	76.0	76.0	77.0	76.0	76.0	74.0	61.0	73.0	72.0	77.0	70.0	65.0
Mean	66.60	65.20	64.70	63.28	62.98	63.0	62.93	63.78	60.50	62.12	61.50	65.92	67.67	
SD	5.63	5.64	5.37	5.22	5.26	5.20	5.20	5.01	0.71	3.41	3.24	4.75	2.08	
p		0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	0.500	<0.001*	<0.001*	0.605	0.287	-

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 (9): Comparison between the studied groups according to mean arterial blood pressure.

	Baseline	Before induction	During the procedure							Post-operative				
			0 min	15 min	30 min	45 min	60 min	75 min	90 min	0 min	30 min	60 min	90 min	120 min
Group K														
Min.	59.0	58.0	57.0	56.0	55.0	56.0	56.0	54.0	55.0	59.0	56.0	60.0	63.0	-
Max.	80.0	79.0	77.0	75.0	76.0	76.0	76.0	77.0	75.0	75.0	75.0	82.0	87.0	-
Mean	69.05	68.38	66.42	65.62	64.90	65.43	64.74	64.50	66.0	65.60	64.22	70.28	72.67	-
SD	6.06	6.05	5.87	5.66	5.85	6.12	6.06	6.67	8.87	4.18	4.45	6.10	12.66	-
Group D														
Min.	59.0	57.0	56.0	56.0	56.0	56.0	55.0	57.0	60.0	58.0	58.0	60.0	66.0	65.0
Max.	79.0	77.0	76.0	76.0	77.0	76.0	76.0	74.0	61.0	73.0	72.0	77.0	70.0	
Mean	66.60	65.20	64.70	63.28	62.98	63.0	62.93	63.78	60.50	62.12	61.50	65.92	67.67	
SD	5.63	5.64	5.37	5.22	5.26	5.20	5.20	5.01	0.71	3.41	3.24	4.75	2.08	
t	1.874	2.429*	1.371	1.930	1.547	1.813	1.239	0.415	0.826	4.076*	3.129*	3.335*	0.675	
p	0.065	0.017*	0.174	0.057	0.126	0.074	0.221	0.680	0.455	<0.001*	0.002*	0.001*	.566	

t: Student t-test

*: Statistically significant at $p \leq 0.05$.

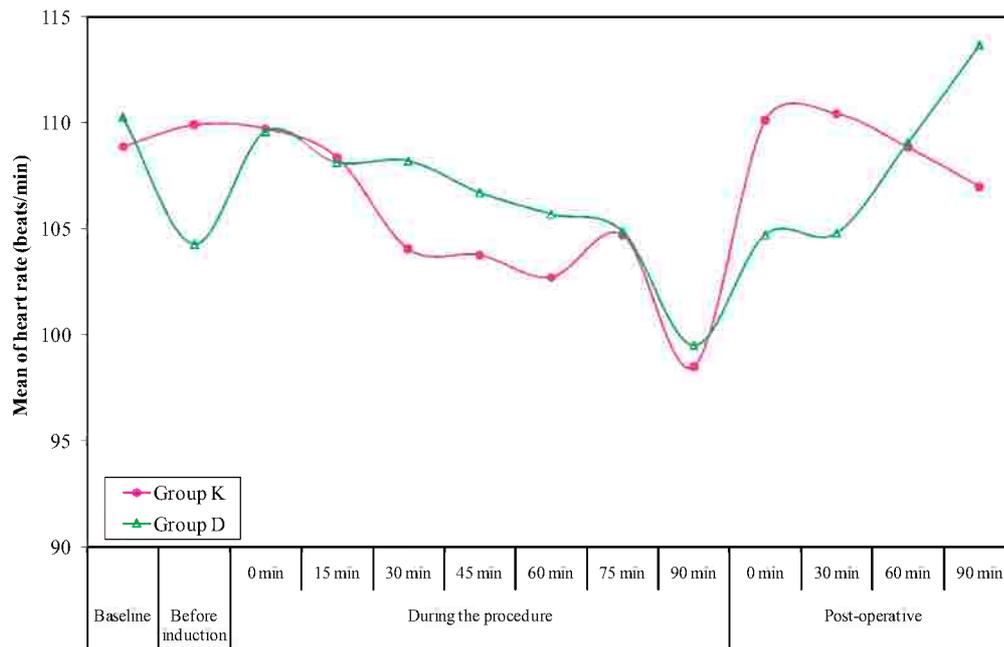


Fig. (6): Comparison between the two studied groups regarding mean arterial blood pressure.

Changes in the percentage of oxygen saturation (SaO₂%) (Table 10,11, 12) (Figure 7)

Group K

i. Before sedation

The base-line value (before sedation) ranged from 98 to 99 %, with a mean of 98.65 ± 0.48 %.

ii. After sedation, before induction

At 30 min after sedation, it ranged from 96 to 98 %, with a mean of 97 ± 0.75 %.

iii. Intra-operative

At 0 min, it ranged from 100 to 100 %, with a mean of 100 ± 0 %.

At 15 min, it ranged from 99 to 100 %, with a mean of 99.9 ± 0.3 %.

At 30 min, it ranged from 99 to 100 %, with a mean of 99.98 ± 0.16 %.

At 45 min, it ranged from 99 to 100 %, with a mean of 99.97 ± 0.16 %.

At 60 min, it ranged from 99 to 100 %, with a mean of 99.97 ± 0.18 %.

At 75 min, it ranged from 99 to 100 %, with a mean of 99.96 ± 0.2 %. There was a statistically significant increase in the percentage of oxygen saturation when compared to the base line (P value < 0.001).

At 90 min, it ranged from 99 to 100 %, with a mean of 99.5 ± 0.58 %.

iv. Postoperative

At 0 min, it ranged from 96 to 98 %, with a mean of 96.83 ± 0.68 %.

At 30 min, it ranged from 97 to 99 %, with a mean of 98.57 ± 0.55 %.

At 60 min, it ranged from 99 to 99 %, with a mean of 99 ± 0 %.

At 90 min, it ranged from 99 to 99 %, with a mean of 99 ± 0 %.

Group D

i. Before sedation

The base-line value (before sedation) ranged from 98 to 99 %, with a mean of 98.63 ± 0.49 %.

ii. After sedation, before induction

At 30 min after sedation, it ranged from 96 to 99 %, with a mean of 97.3 ± 0.76 %.

iii. Intra-operative

At 0 min, it ranged from 100 to 100 %, with a mean of 100 ± 0 %.

At 15 min, it ranged from 99 to 100 %, with a mean of 99.85 ± 0.36 %.

At 30 min, it ranged from 100 to 100 %, with a mean of 100 ± 0 %.

At 45 min, it ranged from 99 to 100 %, with a mean of 99.97 ± 17 %.

At 60 min, it ranged from 100 to 100 %, with a mean of 100 ± 0 %.

At 75 min, it ranged from 99 to 100 %, with a mean of 99.91 ± 0.29 %.

At 90 min, it ranged from 100 to 100 %, with a mean of 100 ± 0 %.

iv. Postoperative

At 0 min, it ranged from 96 to 98 %, with a mean of 96.8 ± 0.56 %.

At 30 min, it ranged from 97 to 99 %, with a mean of 98.53 ± 0.55 %.

At 60 min, it ranged from 99 to 99 %, with a mean of 99 ± 0 %.

At 90 min, it ranged from 99 to 99 %, with a mean of 99 ± 0 %.

At 120 min, the reading was with a mean 99 %.

Comparison between both groups

There was no significant difference as regards percentage of oxygen saturation before sedation "base line" (P value = 0.819), at 30 min after sedation (P value = 0.079), intra-operative at 15 min (P value = 0.505), 30 min (P value = 0.323), 45 min (P value = 0.969), 60 min (P value = 0.325), 75 min (P value = 0.536), 90 min (P value = 0.182), and post-operative at 0 min (P value = 0.858), 30 min (P value = 0.686).

Table (10): Descriptive of the studied cases according to oxygen saturation percentage (SpO2%) in group K

	Baseline	Before induction	During the procedure							Post-operative			
			0 min	15 min	30 min	45 min	60 min	75 min	90min	0 min	30 min	60 min	90 min
1	98	97	100	100	100	100	100	100	99	96	97	99	
2	99	98	100	100	100	100	100	100		96	98	99	
3	99	98	100	100	100	100	100			96	98		
4	99	98	100	100	100	100	100	100		97	98	99	
5	98	98	100	100	100	100	100			97	99	99	
6	98	97	100	99	100	100	100	99	100	97	99	99	
7	98	97	100	100	100	100	100	100		98	99	99	
8	98	96	100	99	100	100				96	99	99	
9	99	97	100	100	100	100	100	100		97	99	99	
10	99	97	100	100	100					96	98	99	
11	99	96	100	100	99	100				96	98		
12	99	96	100	100	100	100	100			97	98		
13	98	96	100	100	100	100	100	100	99	97	99	99	
14	99	97	100	100	100	100				97	98	99	
15	99	98	100	100	100					97	99	99	
16	98	97	100	100	100	100	100	100		97	98	99	
17	99	98	100	100	100	100	100	100		96	99	99	
18	99	97	100	100	100	100	100	100		97	99	99	
19	99	97	100	100	100	100	100	100		97	99		
20	99	98	100	99	100	100				97	98	99	
21	98	96	100	99	100	100	99	100		96	98	99	
22	99	97	100	100	100	100	100	100		97	99	99	
23	98	97	100	100	100	100	100	100		96	99	99	99
24	99	96	100	100	100					96	98		
25	98	96	100	100	100	100	100	100		98	99		
26	99	97	100	100	100	100	100	100		97	99	99	
27	99	96	100	100	100	100	100			97	99	99	
28	99	98	100	100	100	100	100	100		96	98	99	
29	99	98	100	100	100	100	100			98	99	99	
30	99	97	100	100	100	100	100	100	100	97	99	99	
31	98	97	100	100	100	100	100	100		97	99	99	
32	99	98	100	100	100	100				98	98	99	
33	99	98	100	100	100	100	100	100		97	99	99	
34	99	97	100	100	100	99	100			97	98		
35	98	96	100	100	100	100	100	100		98	99	99	99
36	99	97	100	100	100	100	100	100		97	99	99	
37	98	97	100	100	100	100				96	99	99	
38	99	96	100	100	100	100	100	100		96	98	99	
39	98	96	100	100	100	100	100			98	99	99	99
40	99	97	100	100	100	100	100	100		97	99		
Min.	98.0	96.0	100.0	99.0	99.0	99.0	99.0	99.0	99.0	96.0	97.0	99.0	99.0
Max.	99.0	98.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.0	99.0	99.0	99.0
Mean	98.65	97.0	100.0	99.90	99.98	99.97	99.97	99.96	99.50	96.83	98.57	99.0	99.0
SD	0.48	0.75	0.0	0.30	0.16	0.16	0.18	0.20	0.58	0.68	0.55	0.0	0.0

Table (11): Descriptive of the studied cases according to oxygen saturation percentage (SpO2%) in group D

	Baseline	Before induction	During the procedure							Post-operative				
			0 min	15 min	30 min	45 min	60 min	75 min	90min	0 min	30 min	60 min	90min	120 min
1	98	98	100	100	100	100	100			96	97	99		
2	99	97	100	100	100	100	100	100		97	98	99		
3	99	97	100	100	100	100	100	100		96	98	99		
4	99	98	100	100	100	100				97	98	99		
5	98	97	100	100	100	100	100	100		97	99	99		
6	98	97	100	100	100	100	100			97	99	99		
7	98	97	100	100	100	100	100	100		96	99	99	99	99
8	99	97	100	99	100	100	100	99		97	98	99		
9	99	96	100	100	100	100				97	99	99		
10	99	96	100	100	100	100	100	100		96	98	99		
11	99	97	100	99	100	100	100			96	98	99	99	
12	99	99	100	100	100	100	100	100		97	98	99		
13	98	96	100	100	100	100	100	100		97	99			
14	99	97	100	100	100	100	100			97	98			
15	99	98	100	100	100	100	100	100		97	99	99		
16	99	98	100	100	100	100	100	100		97	99	99		
17	99	97	100	100	100					96	98	99		
18	99	98	100	100	100	100	100	100		97	99	99		
19	99	97	100	100	100	100				97	99	99		
20	98	97	100	99	100					96	98	99		
21	98	98	100	100	100	100	100	100	100	97	98	99		
22	99	98	100	100	100	100				97	99	99		
23	98	97	100	99	100					96	99	99		
24	99	98	100	100	100	100	100	100		96	98	99		
25	98	96	100	100	100	100	100	100		97	99			
26	99	98	100	100	100	100	100	100		98	99	99		
27	98	96	100	100	100	100	100	100		97	98	99		
28	99	97	100	100	100	100				96	99	99		
29	99	96	100	100	100	100	100	100		98	99	99		
30	99	98	100	100	100	99	100	100		97	99	99	99	
31	98	97	100	100	100	100	100	100		97	99	99		
32	98	98	100	100	100	100	100			97	98	99		
33	99	98	100	100	100	100	100	99		97	99	99		
34	99	98	100	100	100	100	100			98	99	99		
35	99	98	100	100	100	100	100	100	100	97	98	99		
36	99	97	100	100	100	100	100	100		97	99	99		
37	98	97	100	99	100	100				97	99	99		
38	98	98	100	100	100	100	100	100		96	98	99		
39	99	98	100	100	100					97	98	99		
40	98	97	100	99	100					97	99	99		
Min.	98.0	96.0	100.0	99.0	100.0	99.0	100.0	99.0	100.0	96.0	97.0	99.0	99.0	
Max.	99.0	99.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.0	99.0	99.0	99.0	99.0
Mean	98.63	97.30	100.0	99.85	100.0	99.97	100.0	99.91	100.0	96.80	98.53	99.0	99.0	99.0
SD	0.49	0.76	0.0	0.36	0.0	0.17	0.0	0.29	0.0	0.56	0.55	0.0	0.0	99.0

Table (12): Comparison between the studied groups according to oxygen saturation percentage (SpO2%)

	Baseline	Before induction	During the procedure							Post-operative				
			0 min	15 min	30 min	45 min	60 min	75 min	90 min	0 min	30 min	60 min	90 min	120 min
Group K														
Min.	98.0	96.0	100.0	99.0	99.0	99.0	99.0	99.0	99.0	96.0	97.0	99.0	99.0	98.0
Max.	99.0	98.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.0	99.0	99.0	99.0	99.0
Mean	98.65	97.0	100.0	99.90	99.98	99.97	99.97	99.96	99.50	96.83	98.57	99.0	99.0	98.65
SD	0.48	0.75	0.0	0.30	0.16	0.16	0.18	0.20	0.58	0.68	0.55	0.0	0.0	0.48
Group D														
Min.	98.0	96.0	100.0	99.0	100.0	99.0	100.0	99.0	100.0	96.0	97.0	99.0	99.0	99.0
Max.	99.0	99.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.0	99.0	99.0	99.0	
Mean	98.63	97.30	100.0	99.85	100.0	99.97	100.0	99.91	100.0	96.80	98.53	99.0	99.0	
SD	0.49	0.76	0.0	0.36	0.0	0.17	0.0	0.29	0.0	0.56	0.55	0.0	0.0	
T	0.230	1.778	-	0.670	1.000	0.039	1.000	0.624	1.732	0.180	0.405	-	-	-
P	0.819	0.079	-	0.505	0.323	0.969	0.325	0.536	0.182	0.858	0.686	-	-	-

t: Student t-test

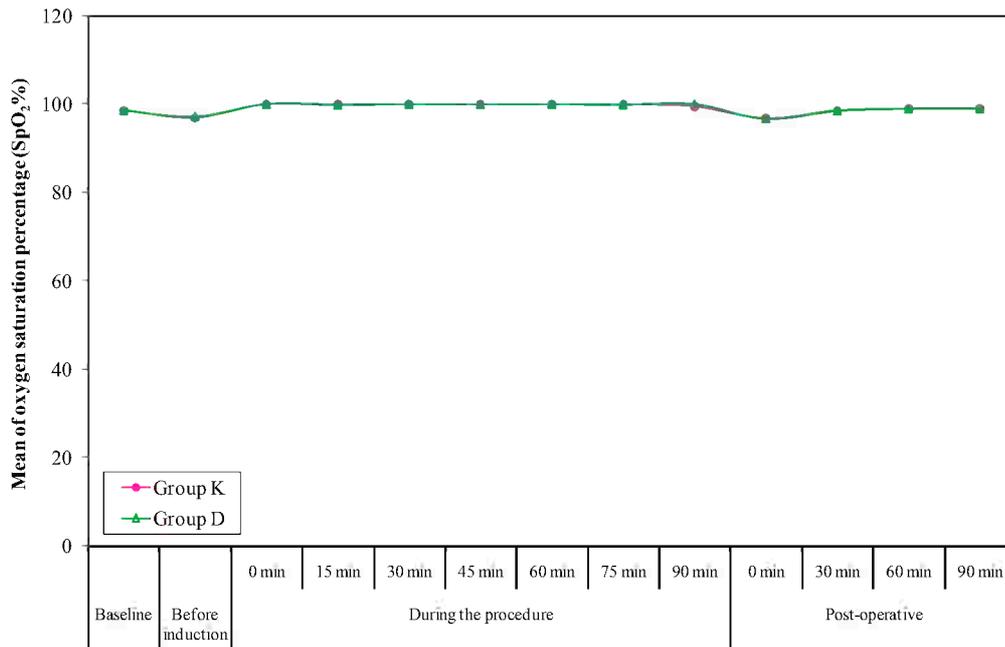


Fig. (7): Comparison between the two studied groups regarding oxygen saturation(SaO₂ %).

Assessment of sedation

1) Sedative score. (Table 13) (Figure 8)

Group K

Patients score ranged from 3 to 7 with mean 5.1 ± 1.08 .

Group D

Patients score ranged from 3 to 6 with mean 4.2 ± 0.91

Comparison between both groups

The readings showed a significant difference between both groups, with better sedation in group D (P value < 0.001).

Table (13): Comparison between the two studied groups according to assement of sedation

	Assessment of sedation	
	Group K	Group D
1	4	5
2	4	5
3	4	5
4	4	4
5	5	4
6	3	4
7	5	4
8	3	3
9	3	3
10	5	4
11	5	4
12	5	3
13	6	4
14	6	4
15	6	5
16	6	4
17	5	6
18	5	6
19	5	3
20	5	3
21	6	5
22	6	5
23	6	4
24	7	4
25	7	6
26	7	3
27	7	3
28	4	3
29	4	5
30	4	5
31	5	4
32	5	4
33	5	5
34	6	4
35	6	4
36	5	4
37	5	3
38	4	6
39	5	4
40	6	4
Min. – Max.	3.0 - 7.0	3.0 – 6.0
Mean ± SD.	5.10 ± 1.08	4.20 ± 0.91
t	4.025*	
p	<0.001*	

t: Student t-test

*: Statistically significant at $p \leq 0.05$

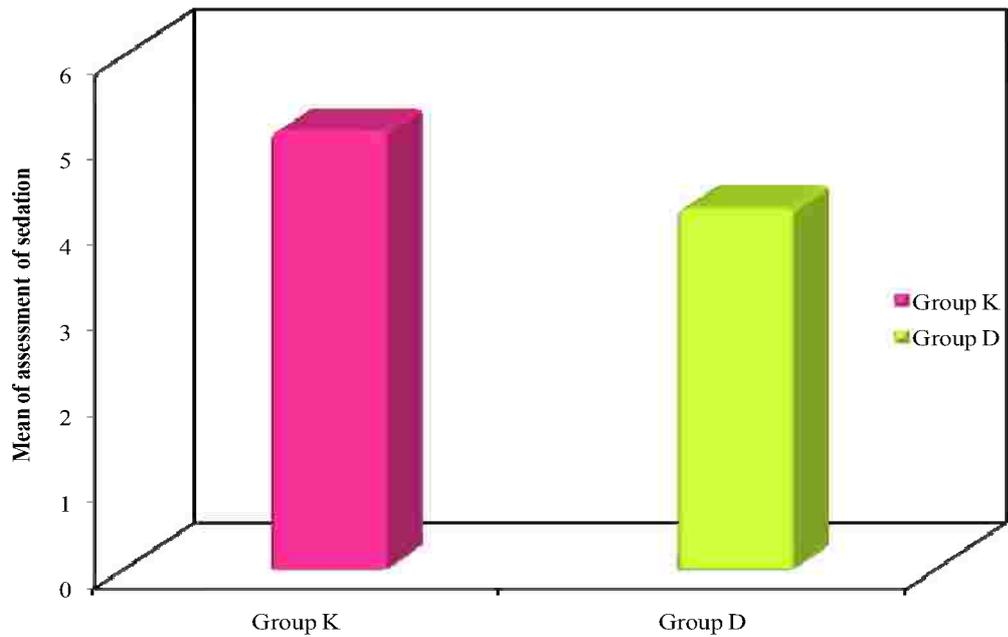


Fig. (8): Comparison between the two studied group regarding sedative score.

**2) Ease of Separation and Ease of Venipuncture Score System. (Table14)
(Figure 9)**

Group K

Patients score ranged from 2 to 3 with mean 2.6 ± 0.5

Group D

Patients score ranged from 1 to 3 with mean 1.63 ± 0.74

Comparison between both groups

The readings showed a significant difference between both groups, with easier separation and venipuncture in group D (P value < 0.001).

Table (14): Comparison between the two studied groups according to assessment of ease of separation and venipuncture

	Assessment of ease of separation and venipuncture	
	Group K	Group D
1	2	2
2	2	2
3	2	2
4	2	2
5	2	1
6	3	1
7	3	1
8	3	1
9	3	1
10	2	1
11	2	1
12	2	1
13	3	1
14	3	1
15	3	3
16	3	2
17	2	3
18	3	3
19	3	1
20	3	1
21	3	2
22	3	1
23	3	1
24	3	1
25	3	3
26	3	1
27	3	1
28	3	1
29	3	2
30	2	2
31	2	1
32	2	2
33	2	3
34	3	1
35	3	2
36	3	2
37	2	2
38	2	3
39	2	1
40	3	2
Min. – Max.	2.0 – 3.0	1.0 – 3.0
Mean ± SD.	2.60 ± 0.50	1.63 ± 0.74
t	6.919*	
p	<0.001*	

t: Student t-test

*: Statistically significant at $p \leq 0.05$

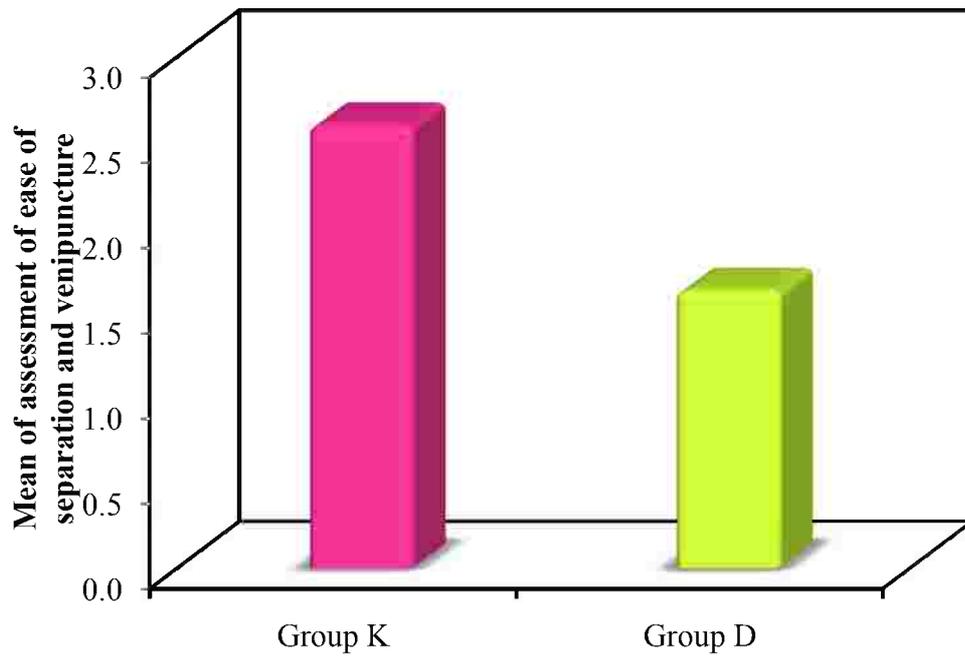


Fig. (9): Comparison between the two studied groups regarding ease of separation and ease of induction score system.

Recovery time (min): (Table 15,16,17) (figure 10)

Group K

Five (12.5%) patients recovered at 10 min, fourteen (35%) patients at 20 min, twenty one (52.5%) at 30 min.

Group D

Twelve (30%) patients recovered at 10 min, three (7.5%) patients at 20 min, twenty five (62.5%) at 30 min.

Comparison between both groups

There was no statistically significant difference between two groups as regards recovery time from anesthesia.

Table (15): Descriptive of the studied cases according to assessment of recovery using "Vancouver sedative recovery scale for children" in K group

	Assessment of recovery			
	0 min	10 min	20 min	30 min
1	No	Yes	No	No
2	No	Yes	No	No
3	No	Yes	No	No
4	No	No	Yes	No
5	No	No	Yes	No
6	No	No	No	Yes
7	No	No	No	Yes
8	No	No	No	Yes
9	No	No	No	Yes
10	No	No	No	Yes
11	No	No	No	Yes
12	No	No	No	Yes
13	No	No	Yes	No
14	No	No	Yes	No
15	No	No	Yes	No
16	No	No	Yes	No
17	No	No	No	Yes
18	No	Yes	No	No
19	No	Yes	No	No
20	No	No	Yes	No
21	No	No	Yes	No
22	No	No	No	Yes
23	No	No	No	Yes
24	No	No	No	Yes
25	No	No	No	Yes
26	No	No	No	Yes
27	No	No	No	Yes
28	No	No	No	Yes
29	No	No	Yes	No
30	No	No	Yes	No
31	No	No	Yes	No
32	No	No	Yes	No
33	No	No	No	Yes
34	No	No	No	Yes
35	No	No	No	Yes
36	No	No	No	Yes
37	No	No	No	Yes
38	No	No	Yes	No
39	No	No	Yes	No
40	No	No	No	Yes
No	40 (100.0%)	35 (87.5%)	26 (65%)	19 (47.5%)
Yes	0 (0.0%)	5 (12.5%)	14 (35%)	21 (52.5%)

Table (16): Descriptive of the studied cases according to assessment of recovery using "Vancouver sedative recovery scale for children" in D group

	Assessment of recovery			
	0 min	10 min	20 min	30 min
1	No	No	Yes	No
2	No	No	Yes	No
3	No	No	No	Yes
4	No	No	No	Yes
5	No	No	No	Yes
6	No	No	No	Yes
7	No	No	Yes	No
8	No	Yes	No	No
9	No	Yes	No	No
10	No	No	No	Yes
11	No	No	No	Yes
12	No	No	No	Yes
13	No	No	No	Yes
14	No	No	No	Yes
15	No	Yes	No	No
16	No	Yes	No	No
17	No	Yes	No	No
18	No	Yes	No	No
19	No	No	No	Yes
20	No	No	No	Yes
21	No	No	No	Yes
22	No	No	No	Yes
23	No	Yes	No	No
24	No	No	No	Yes
25	No	No	No	Yes
26	No	No	No	Yes
27	No	No	No	Yes
28	No	Yes	No	No
29	No	Yes	No	No
30	No	No	No	Yes
31	No	Yes	No	No
32	No	No	No	Yes
33	No	No	No	Yes
34	No	No	No	Yes
35	No	No	No	Yes
36	No	No	No	Yes
37	No	Yes	No	No
38	No	Yes	No	No
39	No	No	No	Yes
40	No	No	No	Yes
No	40 (100.0%)	28 (70.0%)	37 (92.5%)	15 (37.5%)
Yes	0 (0.0%)	12 (30.0%)	3 (7.5%)	25 (62.5%)

Table (17): Comparison between the studied groups according to assessment of recovery using "Vancouver sedative recovery scale for children"

	Assessment of recovery			
	0 min	10 min	20 min	30 min
Group K				
No	40 (100.0%)	35 (87.5%)	26 (65%)	19 (47.5%)
Yes	0 (0.0%)	5 (12.5%)	14(35%)	21 (52.5%)
Group D				
No	40 (100.0%)	28 (70.0%)	37 (92.5%)	15 (37.5%)
Yes	0 (0.0%)	12 (30.0%)	3(7.5%)	25 (62.5%)
χ^2	-	3.660	2.739	2.051
p	-	0.056	0.098	0.252

χ^2 : Chi square test

*: Statistically significant at $p \leq 0.05$

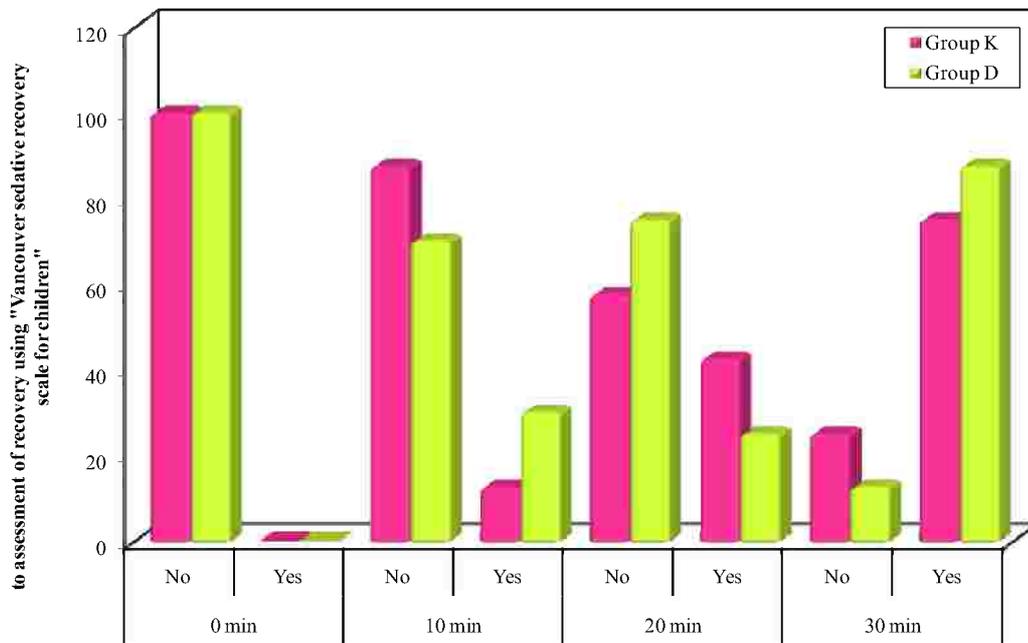


Fig. (10): Comparison between the two studied groups regarding recovery time.

Discharge time (min):(Table 18) (figure 11)

Group K

Discharge time ranged between 70 and 110min, with a mean of 74.38 ± 10.99 min.

Group D

Discharge time ranged between 75 and 120 min, with a mean of 78.13 ± 8.22 min.

Comparison between both groups

The discharge time to home did not differ significantly between the two studied groups ($P = 0.088$).

Table (18): Comparison between the two studied groups according to discharge time

	Discharge time	
	Group K	Group D
1	70	75
2	70	75
3	70	75
4	80	75
5	70	75
6	70	75
7	70	120
8	70	75
9	70	75
10	70	80
11	70	90
12	70	75
13	70	75
14	75	75
15	85	75
16	70	75
17	70	75
18	70	75
19	70	75
20	70	75
21	70	75
22	70	75
23	110	80
24	70	85
25	70	75
26	70	75
27	70	75
28	70	80
29	70	85
30	85	95
31	70	75
32	70	75
33	80	85
34	70	75
35	110	75
36	70	75
37	70	75
38	70	75
39	110	75
40	70	75
Min. – Max.	70.0 – 110.0	75.0 – 120.0
Mean ± SD.	74.38 ± 10.99	78.13 ± 8.22
t	1.728	
p	0.088	

t: Student t-test

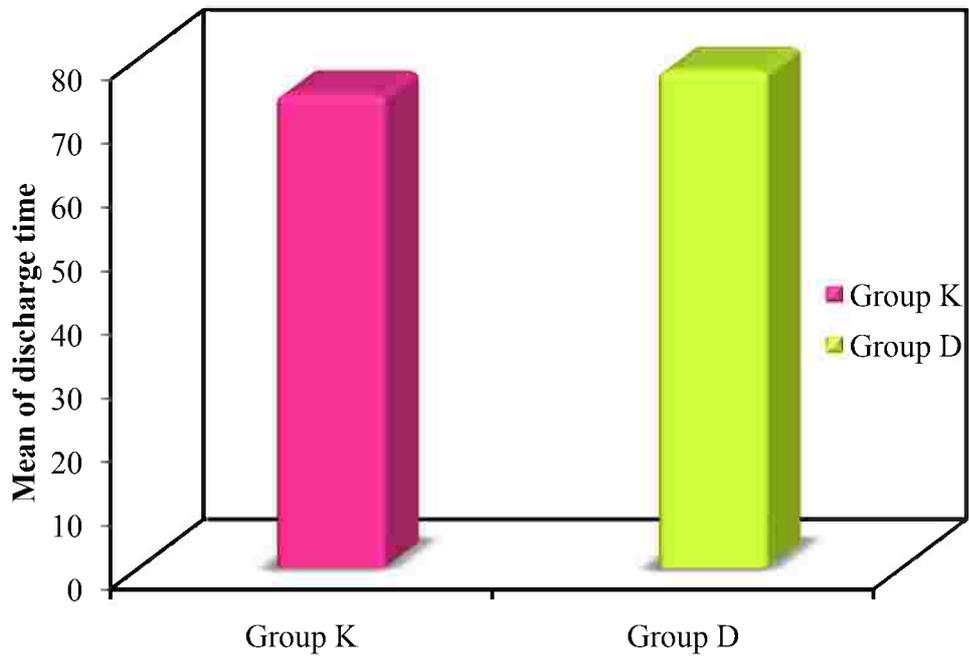


Fig. (11): Comparison between the two studied groups according to discharge time.

Assessment of anterograde amnesia: (Table 19) (figure 12)

Group K

Six patients showed good amnesiac effect (15 %) and thirty four patients showed no amnesiac effect (85%).

Group D

Twenty seven showed good amnesiac effect (67.5%) and thirteen patients showed no amnesiac effect (32.5%).

Comparison between both groups

Anterograde amnesia was more pronounced for patients of group D in comparison to group K. The variations in anterograde amnesia between both groups were significant ($P < 0.001$).

Table (19): Comparison between the two studied groups according to assessment of amnesia

	Assessment of amnesia	
	Group K	Group D
1	No	No
2	Yes	No
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes
9	No	No
10	No	Yes
11	No	Yes
12	No	Yes
13	No	Yes
14	No	Yes
15	No	No
16	No	Yes
17	No	Yes
18	No	No
19	Yes	Yes
20	Yes	No
21	No	No
22	No	Yes
23	No	Yes
24	No	Yes
25	No	Yes
26	No	No
27	No	Yes
28	Yes	Yes
29	No	Yes
30	Yes	Yes
31	No	Yes
32	No	No
33	No	No
34	No	Yes
35	No	No
36	No	Yes
37	Yes	Yes
38	No	No
39	No	No
40	No	Yes
No	34 (85.0%)	13 (32.5%)
Yes	6 (15.0%)	27 (67.5%)
χ^2	22.747*	
p	<0.001*	

χ^2 : Chi square test

*: Statistically significant at $p \leq 0.05$

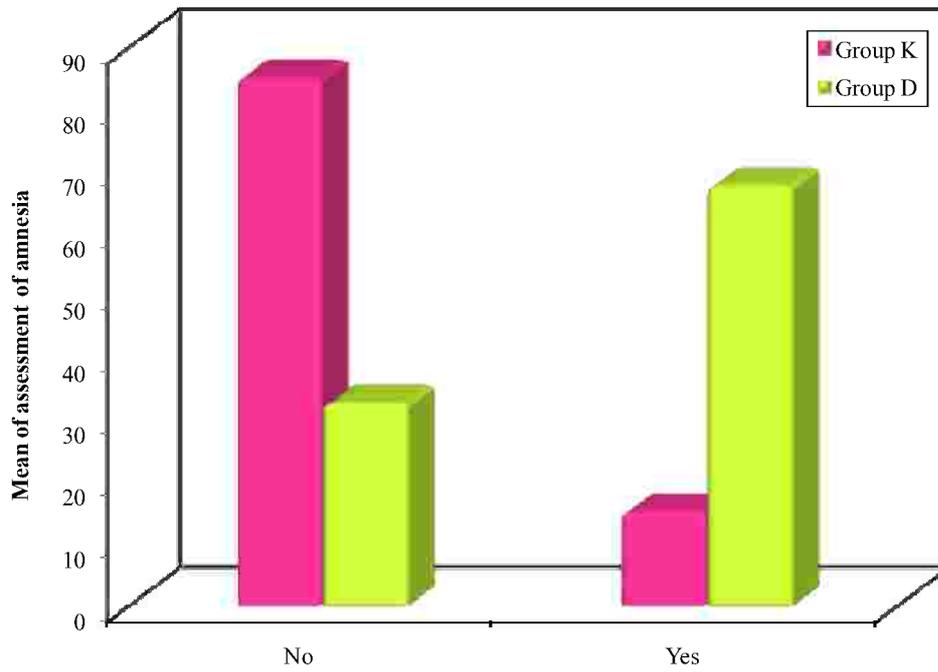


Fig. (12): Comparison between the two studied groups regarding amnesia.