

# **AIM OF THE WORK**

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The present study was carried out to evaluate the efficacy of adding intrathecal dexmedetomidine versus fentanyl to hyperbaric bupivacaine for caesarean section in severe preeclamptic patients as regards sensory and motor blockade, haemodynamic changes, Apgar score, side effects and parturient and surgeons' satisfaction.

# **PATIENTS**

## PATIENTS

After approval of the Local Ethics Committee and an informed written consent from each patient, the current study will be carried in El Shatby Hospital on 50 preeclamptic women, scheduled to have elective cesarean section under spinal anaesthesia; in a prospective, randomized, double blind study using closed envelope method.

### **Inclusion criteria:**

1. American Society of Anaesthesiologists (ASA) physical status III.
2. Patients complicated by severe preeclampsia .

### **Exclusion criteria:**

Patients have:

1. Contraindication to spinal anaesthesia: infection at site of injection, coagulopathy or other bleeding diathesis, low fixed cardiac output, sepsis, uncooperative parturient and evidence of fetal compromise.
2. History of any cardiac disease.
3. Any intraoperative event leading to shifting to general anaesthesia.
4. Maternal bleeding exceeding 1 liter during surgery.
5. Indication requiring oxytocin dose exceeding 5 units.
6. Eclampsia.

Patients will be randomized into 2 groups of 25 each.

### **Group I [Fentanyl group]:**

25 parturient received spinal analgesia consisting of 2 ml of 0.5% hyperbaric bupivacaine and 0.5 ml fentanyl (25µg).

### **Group II [Dexmedetomidine group]:**

25 parturient received spinal analgesia consisting of 2 ml of 0.5% hyperbaric bupivacaine and 0.5ml diluted dexmedetomidine (5µg).

# **METHODS**

## METHODS

Fifty parturient scheduled for elective caesarean delivery under spinal analgesia were categorized into two equal groups. All dexmedetomidine and fentanyl used for this study were preservative free.

### **Pre-operative screening of all parturients included:**

- History taking.
- Complete physical examination.
- Laboratory investigation:
  - Complete Blood Picture (platelet >60000 cells/cmm).
  - Prothrombin time, activated partial thromboplastin time and INR.
  - Liver enzymes: Aspartate transaminase, Alanine transaminase.
  - Serum urea and creatinine.
  - Fasting Blood Sugar.
  - Blood urea and serum creatinine.

Before commencing spinal anaesthesia, standard monitoring was established using multichannel monitor Hewlett Packward, Viridia 24, Germany as follow:

- Electrocardiogram (ECG) for heart rate and rhythm. (Beat/min).
- Non-invasive measurement of arterial blood pressure. (Mean blood pressure in mmHg).
- Oxygen saturation. (SpO<sub>2</sub>%).

Parturients were given intravenous lactated Ringer's solution 10 ml/kg as volume preload (at room temperature 23-25°C which will be settled and recorded). Oxygen was administered through a face mask (4L/minute). Spinal analgesia was performed in the sitting position at the L3-4 interspace with midline approach by using a 25 gauge needle. Foley's catheter will be inserted to check for urine output, before intrathecal injection 4 g magnesium sulphate in 500 ml lacted Ringer's solution intravenous will be given over 20 minutes, after intrathecal injection, parturient were placed supine with left uterine displacement with a wedge beneath the right hip to maintain a pelvic tilt, patients will be transferred to postoperative anaesthesia care unit (PACU). Before surgery all patients will be given instructions on the visual analogue scale (VAS) to be used in their assessment.

### **Measurements**

#### **The following parameters were measured:**

##### **I- Parturient data:**

- 1- Parturient age (years).
- 2- Parturient weight (kg).
- 3- Duration of the operation (minutes).

##### **II- Haemodynamic measurements:**

- 1- Pulse rate (PR in beat / min).
- 2- Non-invasive measurement of mean arterial blood pressure (MABP in mmHg).

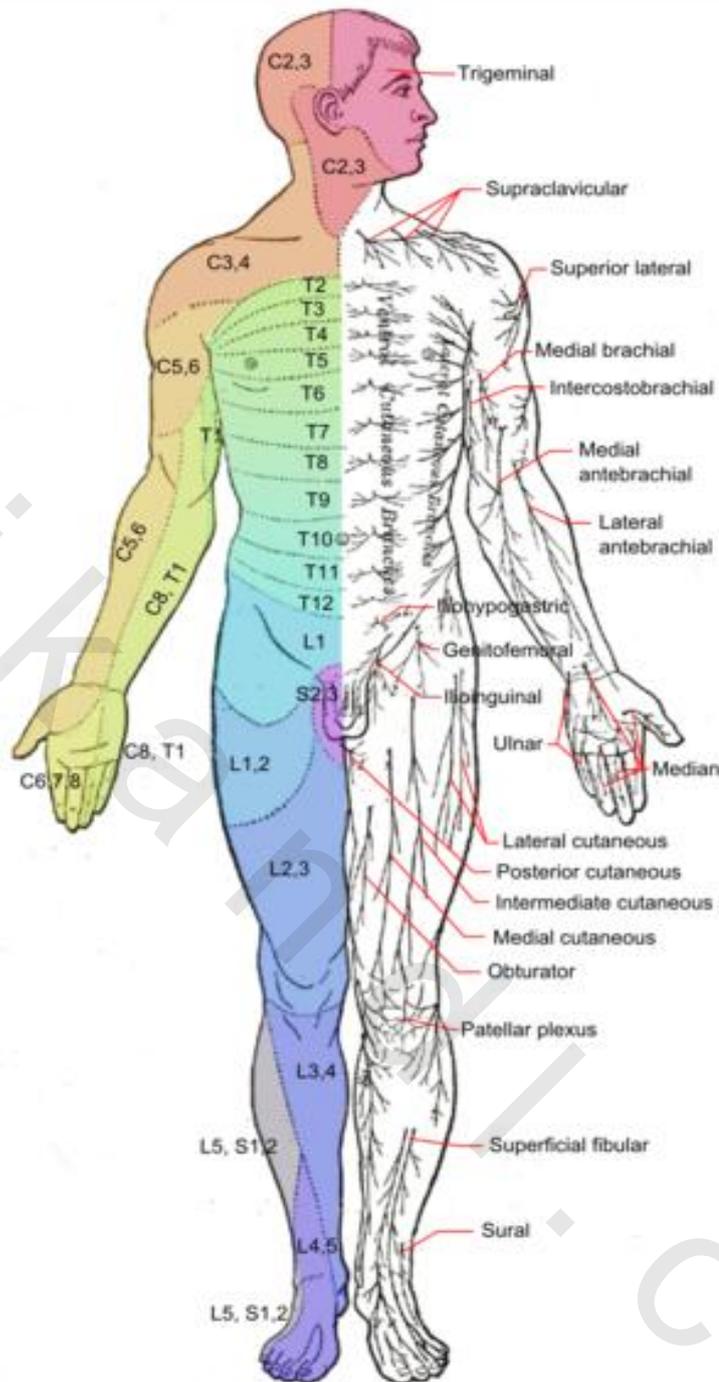
3-Oxygen saturation (SpO<sub>2</sub> %).

All previous parameters were continuously monitored and recorded at the following periods:

- 1- Before spinal analgesia.
- 2- Immediate after spinal analgesia and every 15 minutes until end of surgery.
- 3- Every hour for 6 hours postoperative.

### **III-Assessment of sensation:**

- 1- Sensory analgesia was assessed by ice to measure the following:
  - A- Onset of sensory analgesia in min.(defined as time in minutes to reach highest sensory level) tested every minute after intrathecal injection till reaching the highest level<sup>(14)</sup>.
  - B- Sensory level of analgesia.
  - C- Duration of analgesia (defined as the time it takes for sensory level to decrease to dermatomal level 12) measured from the highest obtained sensory level every 15 minutes.<sup>(9)</sup>
- 2- Pain intensity was evaluated by using a visual analogue scale (VAS) starting from the first pain experienced by the parturient till the end of study with 0 corresponding to no pain and 10 to the worst pain imaginable measured every 15 minutes intraoperative and every hour for 6 hours post operative.<sup>(70)</sup>
- 3- Time for first request of analgesia<sup>(71)</sup> in post operative care unit (PACU) was recorded and treated by intravenous diclofenac sodium 75 mg and repeated if needed up to 2 ampoules and if pain persists 25mg pethidine was given intravenous.



**Figure (8):** human sensory dermatomes. <sup>(14)</sup>

#### **IV-Assessment of motor function:**

Motor blockade was evaluated as follows:

- 1- Onset of motor block.(defined as time in minutes from the end of drug injection intrathecally until parturient unable to move hip, knee or ankle) <sup>(14)</sup> tested every minute after intrathecal injection.

- 2- Block resolution was recorded every 15 min intra-operative and in the post-operative care- unit until complete resolution of motor block using modified Bromage-score. <sup>(72)</sup>
- 0: Able to raise straightened legs against resistance, detectable motor block.
  - 1: Unable to raise straightened legs but able to flex knee.
  - 2: Unable to flex knees but able to flex ankle.
  - 3: Unable to move hip, knee or ankle.
- 3- Duration of motor block in minutes was recorded from the time of the onset of the block to the time when the parturient were able to lift their legs in bed against gravity measured every 15 min. <sup>(14)</sup>

### V-Side effects:

Incidence of peri-operative side effects including (hypotension, bradycardia, respiratory depression, sedation, itching, nausea and vomiting) was noted.

Hypotension is defined as a decrease in systolic blood pressure to 20% less than base line value; it was treated with incremental intravenous ephedrine (5:10 mg). <sup>(73)</sup>

Itching is defined as skin tingling or irritation that makes the parturient want to scratch the itchy area. <sup>(74)</sup>

Respiratory depression (defined as respiratory rate <10). <sup>(73)</sup>

Sedation was assessed by Ramsay Sedation Score. <sup>(75)</sup>

**Table I: Ramsay Sedation Score (RSS).** <sup>(75)</sup>

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

### VI-Assessment of fetal well-being:

By Apgar score was recorded at 1 and 5 minutes interval. <sup>(76)</sup>

**Table II: Apgar score.**<sup>(76)</sup>

|          | <b>Sign</b> | <b>0 Point</b>      | <b>1 Point</b>              | <b>2 Points</b> |
|----------|-------------|---------------------|-----------------------------|-----------------|
| <b>A</b> | Activity    | Absent              | Arms and legs flexed        | Active movement |
| <b>P</b> | Pulse       | Absent              | < 100                       | > 100           |
| <b>G</b> | Grimace     | No Response         | Grimace                     | Sneeze, cough   |
| <b>A</b> | Appearance  | Blue, pale all over | Body pink, extremities blue | All pink        |
| <b>R</b> | Respiration | Absent              | Slow, irregular             | Good, crying    |

**VII-Measurement of score satisfaction by the parturient and surgeon.**<sup>(77)</sup>

Scale from 1 - 100. A high score is better than a low score

Very Good = 100.

Good = 75.

Fair = 50.

Poor = 25.

Very Poor = 0.

## Statistical Analysis<sup>(78)</sup>

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0.<sup>(79)</sup> Qualitative data were described using number and percent. Quantitative data were described using range (minimum and maximum), mean, standard and median. Comparison between different groups regarding categorical variables was tested using Chi-square test. 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'Agostino test, also Histogram and QQ plot were used for vision test. If it reveals normal data distribution, parametric tests was applied. If the data were abnormally distributed, non-parametric tests were used. For normally distributed data, comparison between two independent populations were done using independent t-test, Comparison between different periods using ANOVA with repeated measures and Post Hoc test was assessed using Bonferroni adjusted. For abnormally distributed data, comparison between two independent populations were done using Mann Whitney test. To compare between the different Wilcoxon signed ranks test was applied and. Significance of the obtained results was judged at the 5% level.

**a- Mean value**  $(\bar{X}) = \frac{X}{n}$

**Where** X = the sum of all observations.  
n = the number of observations.

**b- The standard deviation S.D.**  $= \sqrt{\frac{\sum (X - \bar{X})^2}{n - 1}}$

**Where**

$\sum (X - \bar{X})^2$  = the sum of squares of differences of observations from the mean.

### **c- Paired-sample “t” test:**

It is used during comparison between the results before and after treatment in the same group. The “t” is calculated as follows:

$$t = \frac{\frac{X_d}{S.D_d}}{\sqrt{n}}$$

**Where**

$X_d$  = Mean of the difference.  
 $S.D_d$  = Standard deviation of the difference.  
n = Number of cases.

#### d- Student (Unpaired-sample) “t” test:

It is used during comparison between the means of different sample groups. The “t” is calculated as follows:

$$t = \frac{X_1 - X_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

Where

$X_1$  = Mean of first group.

$X_2$  = Mean of second group.

$S_1$  = Standard deviation of the first group.

$S_2$  = Standard deviation of the second group.

$n_1$  = Sample size of the first group.

$n_2$  = Sample size of the second group.

#### e- Chi-Square test:

It tests the association between qualitative nominal variables, it is performed mainly on frequencies. It determines whether the observed frequencies differ significantly from expected frequencies.

$$\text{Computed } X^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where

E = expected frequency

O = observed frequency

$$E = \frac{\text{Row total} \times \text{Column total}}{\text{Grand total}}$$

#### f- Fisher’s exact test and Monte Carlo test

This test involves the calculation of the P value directly, without the use of particular test statistic.

$$P = \frac{a+b!c+d!a+c!b+d!}{n!a!b!c!d!}$$

a, b, c, d: are the numbers in each cell

n: the total sample size.

!: factorial = successive multiplication of the integers in descending order.

In case of an r x c table the “MonteCalo” test was used.

# RESULTS

## RESULTS

This study was performed in El-Shatby Maternity University Hospital involving fifty parturient for elective caesarean delivery under spinal analgesia.

The technique was successfully performed with no technical problems. All parturient starting the study completed it successfully and were all included in the subsequent statistical analysis.

Parturient were categorized into two groups:-

Group I: 25 parturients received spinal analgesia consisting of 2 ml of 0.5% hyperbaric bupivacaine and 0.5 ml fentanyl (25 $\mu$ g).

Group II: 25 parturients received spinal analgesia consisting of 2 ml of 0.5% hyperbaric bupivacaine and 0.5ml of diluted dexmedetomidine (5 $\mu$ g).

The results of the present study showed:

**Parturient data:** (tables III- V), (figures 9-11)

### Group I.

The age of the parturients ranged from 19.0 to 33.0 with a mean of  $24.36 \pm 3.99$  years. The weight of the parturient ranged between 56.0 to 87.0 with a mean of  $69.40 \pm 8.09$  kg. The duration of the operation ranged between 25.0 and 46.0 with a mean of  $35.08 \pm 5.60$  min.

### Group II.

The age of the parturient ranged from 18.0 and 31.0 with a mean of  $24.04 \pm 3.68$  years. The weight of the parturient ranged between 59.0 and 80.0 with a mean of  $67.36 \pm 6.34$  kg. The duration of the operation ranged between 28.0 and 49.0 minutes with a mean of  $35.32 \pm 5.10$  min.

### Comparison between the two studied groups

There was no statistically significant difference between both groups as regard the parturient ages ( $p = 0.769$ ), their weights ( $p = 0.326$ ) and the duration of operation ( $p = 0.875$ ).

**Table III: Parturient data for Group I.**

| <b>Parturient no.</b> | <b>Age (years)</b> | <b>Weight (kg)</b> | <b>Duration of the operation (min)</b> |
|-----------------------|--------------------|--------------------|--|
| 1                     | 19                 | 62                 | 34                                     |
| 2                     | 23                 | 64                 | 32                                     |
| 3                     | 33                 | 74                 | 28                                     |
| 4                     | 29                 | 56                 | 31                                     |
| 5                     | 27                 | 78                 | 27                                     |
| 6                     | 25                 | 59                 | 41                                     |
| 7                     | 28                 | 67                 | 40                                     |
| 8                     | 19                 | 71                 | 38                                     |
| 9                     | 23                 | 68                 | 38                                     |
| 10                    | 30                 | 87                 | 32                                     |
| 11                    | 19                 | 70                 | 32                                     |
| 12                    | 20                 | 76                 | 41                                     |
| 13                    | 22                 | 72                 | 46                                     |
| 14                    | 25                 | 68                 | 32                                     |
| 15                    | 19                 | 66                 | 28                                     |
| 16                    | 23                 | 79                 | 25                                     |
| 17                    | 25                 | 63                 | 32                                     |
| 18                    | 23                 | 81                 | 34                                     |
| 19                    | 29                 | 65                 | 36                                     |
| 20                    | 24                 | 65                 | 38                                     |
| 21                    | 20                 | 62                 | 40                                     |
| 22                    | 22                 | 65                 | 40                                     |
| 23                    | 27                 | 72                 | 44                                     |
| 24                    | 25                 | 85                 | 29                                     |
| 25                    | 30                 | 60                 | 39                                     |
| Range                 | 19.0 – 33.0        | 56.0 – 87.0        | 25.0 – 46.0                            |
| Mean                  | 24.36              | 69.40              | 35.08                                  |
| SD ( ± )              | 3.99               | 8.09               | 5.60                                   |

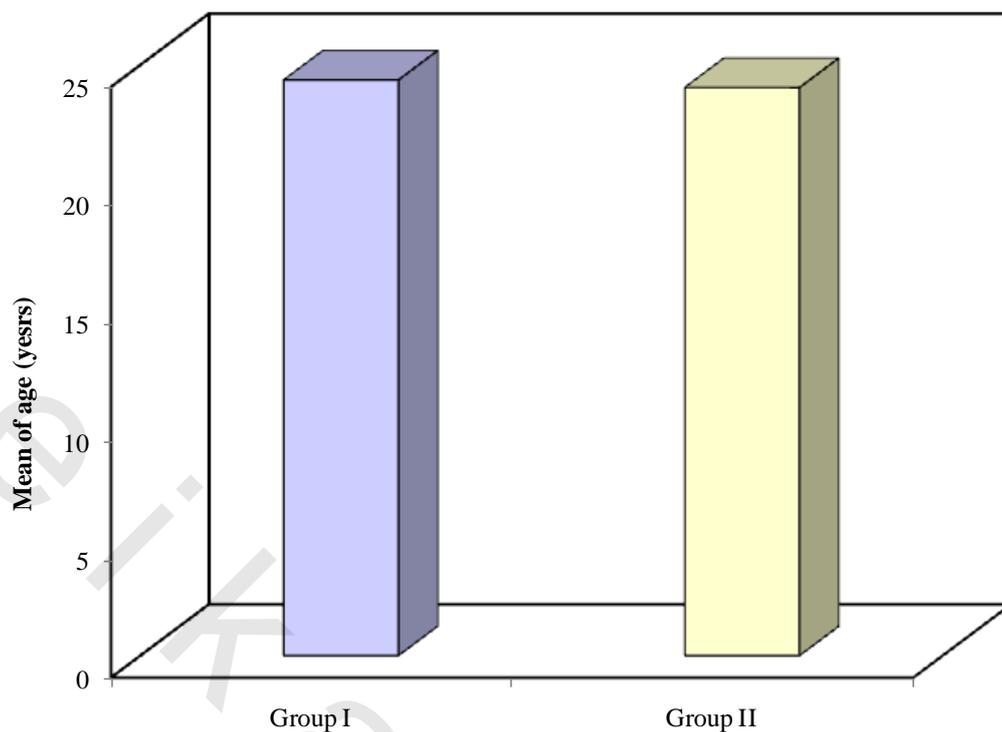
**Table IV: Parturient data for Group II.**

| <b>Parturient no.</b> | <b>Age (years)</b> | <b>Weight (kg)</b> | <b>Duration of the operation (min)</b> |
|-----------------------|--------------------|--------------------|--|
| 1                     | 19                 | 78                 | 49                                     |
| 2                     | 20                 | 65                 | 28                                     |
| 3                     | 22                 | 59                 | 41                                     |
| 4                     | 25                 | 67                 | 34                                     |
| 5                     | 31                 | 65                 | 32                                     |
| 6                     | 29                 | 71                 | 28                                     |
| 7                     | 27                 | 80                 | 31                                     |
| 8                     | 25                 | 67                 | 46                                     |
| 9                     | 28                 | 62                 | 38                                     |
| 10                    | 30                 | 60                 | 32                                     |
| 11                    | 22                 | 63                 | 35                                     |
| 12                    | 22                 | 64                 | 33                                     |
| 13                    | 21                 | 62                 | 39                                     |
| 14                    | 20                 | 67                 | 37                                     |
| 15                    | 18                 | 71                 | 36                                     |
| 16                    | 23                 | 73                 | 36                                     |
| 17                    | 25                 | 69                 | 36                                     |
| 18                    | 23                 | 59                 | 32                                     |
| 19                    | 25                 | 67                 | 32                                     |
| 20                    | 22                 | 77                 | 34                                     |
| 21                    | 27                 | 65                 | 33                                     |
| 22                    | 25                 | 79                 | 29                                     |
| 23                    | 30                 | 60                 | 33                                     |
| 24                    | 22                 | 72                 | 40                                     |
| 25                    | 20                 | 62                 | 39                                     |
| Range                 | 18.0 – 31          | 59.0 – 80.0        | 28.0 – 49.0                            |
| Mean                  | 24.04              | 67.36              | 35.32                                  |
| SD ( ± )              | 3.68               | 6.34               | 5.10                                   |

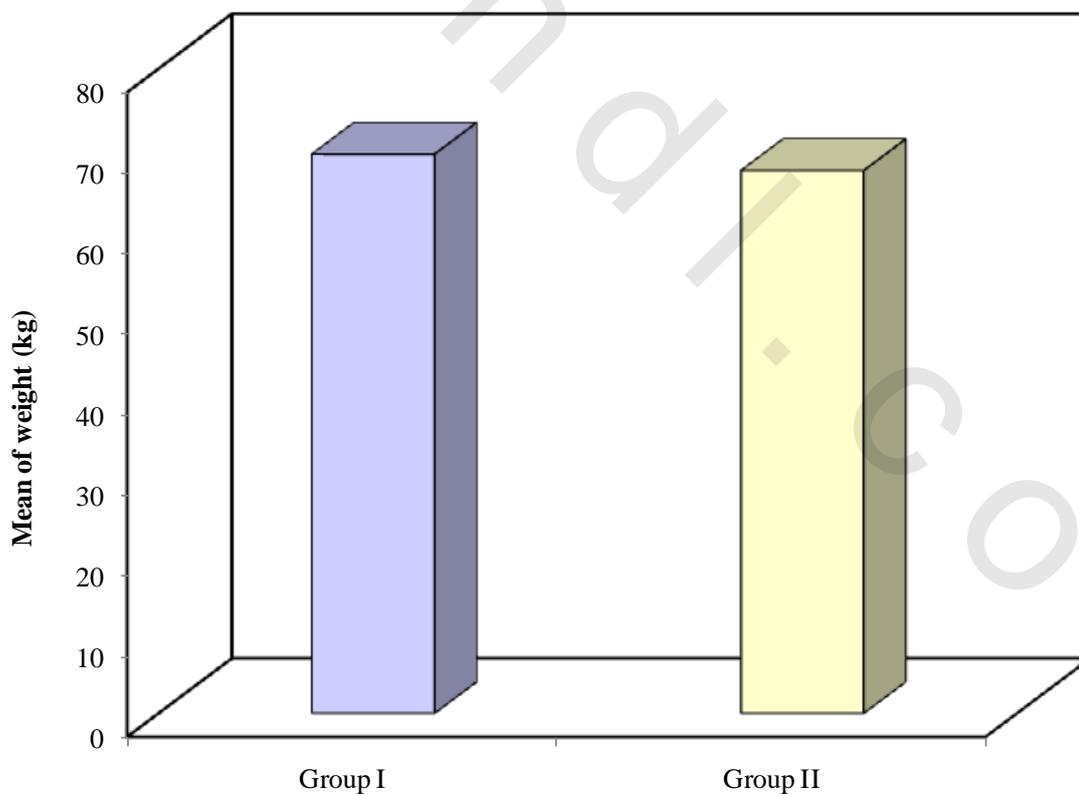
**Table V: Comparison between the two studied groups as regard parturient data.**

|                 | Age (years) | Weight (kg) | Duration of the operation (min) |
|-----------------|-------------|-------------|---------------------------------|
| <b>Group I</b>  |             |             |                                 |
| Range           | 19.0 – 33.0 | 56.0 – 87.0 | 25.0 – 46.0                     |
| Mean            | 24.36       | 69.40       | 35.08                           |
| SD ( ± )        | 3.99        | 8.09        | 5.60                            |
| <b>Group II</b> |             |             |                                 |
| Range           | 18.0 – 31   | 59.0 – 80.0 | 28.0 – 49.0                     |
| Mean            | 24.04       | 67.36       | 35.32                           |
| SD ( ± )        | 3.68        | 6.34        | 5.10                            |
| <b>p</b>        | 0.769       | 0.326       | 0.875                           |

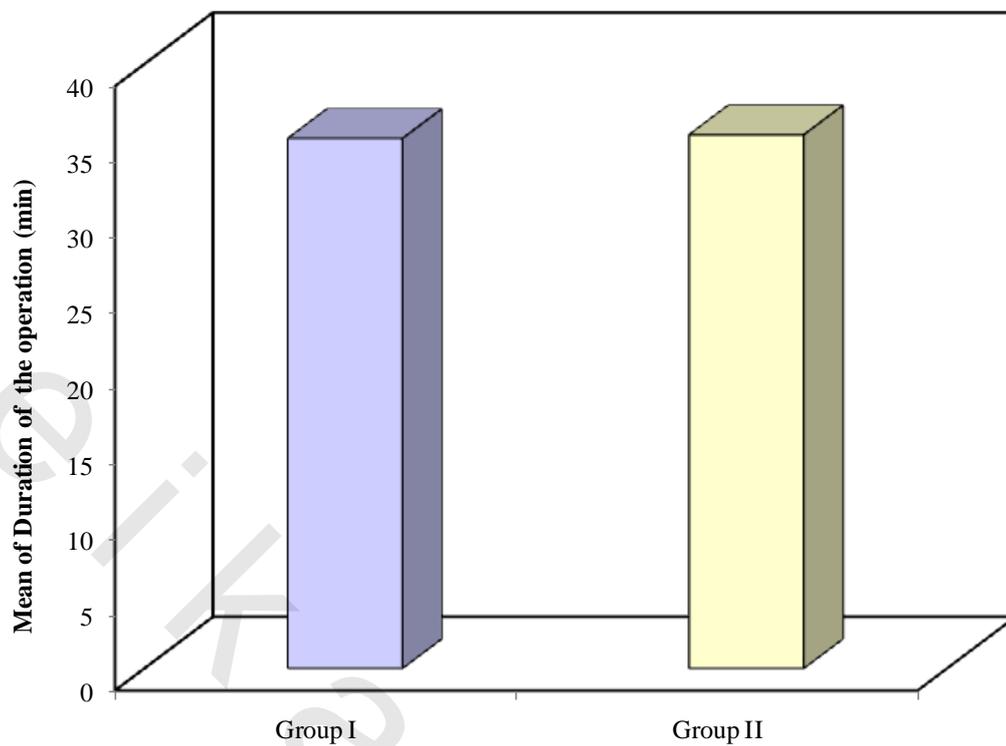
p: p value for Student t-test for comparing between the two studied group



**Figure (9):** Comparison between the two studied groups as regard parturient mean age (years).



**Figure (10):** Comparison between the two studied groups as regard parturient mean weight (kg).



**Figure (11): Comparison between the two studied groups as regard the duration of operation (min).**

## Haemodynamic measurements:

Changes in the heart rate (beat/min). (tables VI,VII,VIII,), (figure 12)

### Group I.

- **Pre operative**

The base-line value of the heart rate (before spinal analgesia) ranged from 78 and 125 with a mean of  $97.76 \pm 11.50$  beat/min.

- **Intra-operative**

Immediately after spinal, heart rate ranged from 72 and 112 with a mean of  $91.08 \pm 9.74$  beat/min.

At 15 min , it ranged from 72 and 110 with a mean of  $88.56 \pm 9.03$  beat/min.

At 30 min , it ranged from 76 and 112 with a mean of  $88.57 \pm 9.96$  beat/min.

At 45 min , the pulse rate was 98 beat/min.

- **Postoperative**

After 1 hour , the heart rate ranged from 74 to 110 with a mean of  $87.00 \pm 8.19$  beat/min.

After 2 hours , it ranged from 72 to 110 with a mean of  $86.68 \pm 9.03$  beat/min.

After 3 hours ,it ranged from 76 to 108 with a mean of  $88.36 \pm 7.72$  beat/min.

After 4 hours ,it ranged from 76 to 106 with a mean of  $90.52 \pm 7.89$  beat/min.

After 5 hours , it ranged from 78 to 110 with a mean of  $88.52 \pm 7.78$  beat/min.

After 6 hours , it ranged from 72 to 106 with a mean of  $87.48 \pm 7.96$  beat/min.

There was significant decrease in heart rate in comparison to base line immediately after spinal,at 15 min,30 min intraoperatively,and after 1 h,2 h,3 h,4 h,5 h and 6 h postoperatively.

### Group II.

- **Pre operative**

The base-line value of the heart rate (before spinal analgesia) ranged from 82 to 120 with a mean of  $100.44 \pm 9.77$  beat/min.

- **Intra-operative**

Immediately after spinal , heart rate ranged from 75 to 110 with a mean of  $93.60 \pm 9.25$  beat/min.

At 15 min , it ranged from 54 to 105 with a mean of  $84.88 \pm 11.13$  beat/min.

At 30 min , it ranged from 56 to 110 with a mean of  $84.58 \pm 11.59$  beat/min.

At 45 min , it ranged from 83.0 to 94.0 beat/min, with a mean of  $88.50 \pm 7.78$  beat/min.

- **Postoperative**

After 1 hour , heart rate ranged from 68 to 102 with a mean of  $84.72 \pm 8.63$  beat/min.

After 2 hours , it ranged from 66 to 106 with a mean of  $85.44 \pm 8.91$  beat/min.

After 3 hours , it ranged from 68 to 104 with a mean of  $85.52 \pm 8.36$  beat/min.

After 4 hours , it ranged from 70 to 102 with a mean of  $87.84 \pm 7.93$  beat/min.

After 5 hours , it ranged from 78 to 104 with a mean of  $89.96 \pm 6.84$  beat/min.

After 6 hours , it ranged from 72 to 100 with a mean of  $86.36 \pm 7.21$  beat/min.

There was significant decrease in heart rate in comparison to base line immediately after spinal, at 15 min, 30 min, 45 min intraoperatively, and after 1 h, 2 h, 3 h, 4 h, 5 h and 6 h postoperatively.

### **Comparison between both groups.**

There was no significant difference in both groups as regard the heart rate before the spinal analgesia "base line" (P value = 0.379), Immediate after spinal (P value = 0.353), intra-operative at 15 min (P value = 0.205), 30 min (P value = 0.226), 45 min (P value = 0.501) and post-operative at 1h (P value = 0.343), 2h (P value = 0.627), 3h (P value = 0.218) , 5h (P value = 0.490) , 6h (P value = 0.956).

Table VI: Changes in Heart rate (beat/min) in Group I.

| Parturient no. | Heart rate (beat/min) |                        |            |            |       |                         |            |            |            |            |            |
|----------------|-----------------------|------------------------|------------|------------|-------|-------------------------|------------|------------|------------|------------|------------|
|                | Baseline              | Intra operative (min)  |            |            |       | Post operative ( hours) |            |            |            |            |            |
|                |                       | Immediate after spinal | 15min      | 30min      | 45min | 1h                      | 2h         | 3h         | 4h         | 5h         | 6h         |
| 1              | 100                   | 92                     | 82         | 82         |       | 86                      | 92         | 94         | 96         | 94         | 94         |
| 2              | 90                    | 82                     | 84         | 84         |       | 86                      | 84         | 88         | 92         | 90         | 88         |
| 3              | 108                   | 92                     | 92         |            |       | 92                      | 90         | 92         | 96         | 92         | 90         |
| 4              | 88                    | 88                     | 84         | 80         |       | 84                      | 83         | 85         | 90         | 86         | 84         |
| 5              | 92                    | 86                     | 84         |            |       | 84                      | 84         | 88         | 92         | 85         | 85         |
| 6              | 115                   | 112                    | 110        | 112        |       | 110                     | 110        | 108        | 106        | 110        | 106        |
| 7              | 96                    | 92                     | 90         | 90         |       | 88                      | 88         | 90         | 86         | 86         | 92         |
| 8              | 125                   | 110                    | 102        | 102        |       | 92                      | 92         | 92         | 94         | 92         | 96         |
| 9              | 90                    | 82                     | 96         | 82         |       | 82                      | 84         | 82         | 92         | 86         | 86         |
| 10             | 92                    | 94                     | 90         | 90         |       | 88                      | 86         | 90         | 86         | 84         | 86         |
| 11             | 102                   | 88                     | 82         | 82         |       | 74                      | 74         | 78         | 82         | 83         | 85         |
| 12             | 88                    | 88                     | 82         | 82         |       | 82                      | 78         | 89         | 85         | 83         | 81         |
| 13             | 114                   | 102                    | 98         | 96         | 98    | 96                      | 96         | 96         | 102        | 94         | 96         |
| 14             | 98                    | 95                     | 92         | 90         |       | 90                      | 88         | 86         | 92         | 85         | 85         |
| 15             | 90                    | 86                     | 86         |            |       | 86                      | 86         | 88         | 88         | 87         | 85         |
| 16             | 101                   | 92                     | 90         |            |       | 86                      | 72         | 76         | 78         | 78         | 78         |
| 17             | 99                    | 92                     | 91         | 90         |       | 90                      | 82         | 86         | 90         | 85         | 86         |
| 18             | 89                    | 88                     | 94         | 96         |       | 90                      | 90         | 92         | 93         | 91         | 88         |
| 19             | 78                    | 72                     | 72         | 76         |       | 76                      | 76         | 76         | 76         | 78         | 72         |
| 20             | 98                    | 92                     | 90         | 87         |       | 82                      | 82         | 86         | 90         | 85         | 83         |
| 21             | 111                   | 75                     | 80         | 79         |       | 75                      | 76         | 104        | 77         | 79         | 76         |
| 22             | 88                    | 110                    | 105        | 110        |       | 83                      | 106        | 78         | 102        | 104        | 85         |
| 23             | 95                    | 82                     | 80         | 82         |       | 94                      | 82         | 83         | 101        | 82         | 100        |
| 24             | 82                    | 90                     | 83         | 90         |       | 102                     | 95         | 87         | 95         | 95         | 83         |
| 25             | 115                   | 95                     | 75         | 78         |       | 77                      | 91         | 95         | 82         | 99         | 72         |
| Range          | 780–125.0             | 72.0– 112.0            | 72.0–110.0 | 76.0–112.0 |       | 74.0–110.0              | 72.0–110.0 | 76.0–108.0 | 76.0–106.0 | 78.0–110.0 | 72.0–106.0 |
| Mean           | 97.76                 | 91.08                  | 88.56      | 88.57      | 98.0  | 87.00                   | 86.68      | 88.36      | 90.52      | 88.52      | 86.48      |
| SD ( ± )       | 11.50                 | 9.74                   | 9.03       | 9.96       |       | 8.19                    | 9.03       | 7.72       | 7.89       | 7.78       | 7.96       |
| p              |                       | 0.031*                 | 0.017*     | 0.020*     | -     | 0.032*                  | 0.045*     | 0.011*     | 0.023*     | 0.017*     | 0.023*     |

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 VII: Changes in Heart rate (beat/min) in Group II.**

| Parturient no. | Heart rate (beat/min) |                        |            |            |           |                        |            |            |            |            |            |
|----------------|-----------------------|------------------------|------------|------------|-----------|------------------------|------------|------------|------------|------------|------------|
|                | Baseline              | Intra operative (min)  |            |            |           | Post operative (hours) |            |            |            |            |            |
|                |                       | Immediate after spinal | 15min      | 30min      | 45min     | 1h                     | 2h         | 3h         | 4h         | 5h         | 6h         |
| 1              | 97                    | 92                     | 65         | 56         | 83        | 85                     | 80         | 84         | 96         | 88         | 86         |
| 2              | 95                    | 88                     | 77         | 74         |           | 74                     | 78         | 78         | 88         | 88         | 84         |
| 3              | 98                    | 92                     | 93         | 94         |           | 90                     | 88         | 91         | 90         | 92         | 90         |
| 4              | 110                   | 98                     | 90         | 87         |           | 88                     | 86         | 86         | 84         | 88         | 92         |
| 5              | 112                   | 100                    | 92         | 94         |           | 92                     | 92         | 94         | 90         | 92         | 98         |
| 6              | 105                   | 92                     | 88         |            |           | 88                     | 88         | 94         | 94         | 94         | 92         |
| 7              | 99                    | 102                    | 92         | 94         |           | 88                     | 94         | 92         | 87         | 96         | 86         |
| 8              | 110                   | 102                    | 88         | 92         | 94        | 94                     | 96         | 94         | 102        | 98         | 96         |
| 9              | 110                   | 108                    | 92         | 88         |           | 82                     | 82         | 82         | 86         | 84         | 86         |
| 10             | 88                    | 82                     | 88         | 82         |           | 78                     | 76         | 74         | 92         | 82         | 87         |
| 11             | 89                    | 100                    | 88         | 84         |           | 76                     | 78         | 82         | 86         | 96         | 86         |
| 12             | 94                    | 90                     | 72         | 72         |           | 68                     | 66         | 68         | 70         | 78         | 72         |
| 13             | 100                   | 92                     | 90         | 90         |           | 92                     | 94         | 90         | 88         | 96         | 90         |
| 14             | 96                    | 96                     | 92         | 90         |           | 90                     | 88         | 86         | 88         | 92         | 90         |
| 15             | 104                   | 100                    | 92         | 90         |           | 90                     | 90         | 88         | 86         | 94         | 86         |
| 16             | 90                    | 82                     | 70         | 72         |           | 78                     | 76         | 74         | 76         | 82         | 80         |
| 17             | 120                   | 110                    | 98         | 96         |           | 94                     | 90         | 90         | 88         | 94         | 96         |
| 18             | 105                   | 92                     | 90         | 86         |           | 86                     | 88         | 84         | 86         | 88         | 82         |
| 19             | 107                   | 80                     | 54         | 62         |           | 68                     | 72         | 72         | 78         | 82         | 82         |
| 20             | 92                    | 90                     | 88         | 88         |           | 86                     | 84         | 88         | 84         | 86         | 82         |
| 21             | 115                   | 95                     | 83         | 82         |           | 102                    | 91         | 104        | 101        | 99         | 72         |
| 22             | 95                    | 82                     | 80         | 78         |           | 94                     | 82         | 83         | 102        | 82         | 100        |
| 23             | 82                    | 110                    | 105        | 110        |           | 77                     | 106        | 87         | 82         | 104        | 85         |
| 24             | 88                    | 90                     | 75         | 79         |           | 75                     | 76         | 78         | 77         | 79         | 76         |
| 25             | 110                   | 75                     | 80         | 90         |           | 83                     | 95         | 95         | 95         | 95         | 83         |
| Range          | 82.0–120.0            | 75.0–110.0             | 54.0–105.0 | 56.0–110.0 | 83.0–94.0 | 68.0–102.0             | 66.0–106.0 | 68.0–104.0 | 70.0–102.0 | 78.0–104.0 | 72.0–100.0 |
| Mean           | 100.44                | 93.60                  | 84.88      | 84.58      | 88.50     | 84.72                  | 85.44      | 85.52      | 87.84      | 89.96      | 86.36      |
| SD ( ± )       | 9.77                  | 9.25                   | 11.13      | 11.59      | 7.78      | 8.63                   | 8.91       | 8.36       | 7.93       | 6.84       | 7.21       |
| <b>p</b>       |                       | 0.04*                  | 0.001*     | 0.001*     | -         | <0.001*                | <0.001*    | <0.001*    | <0.001*    | 0.004*     | <0.001*    |

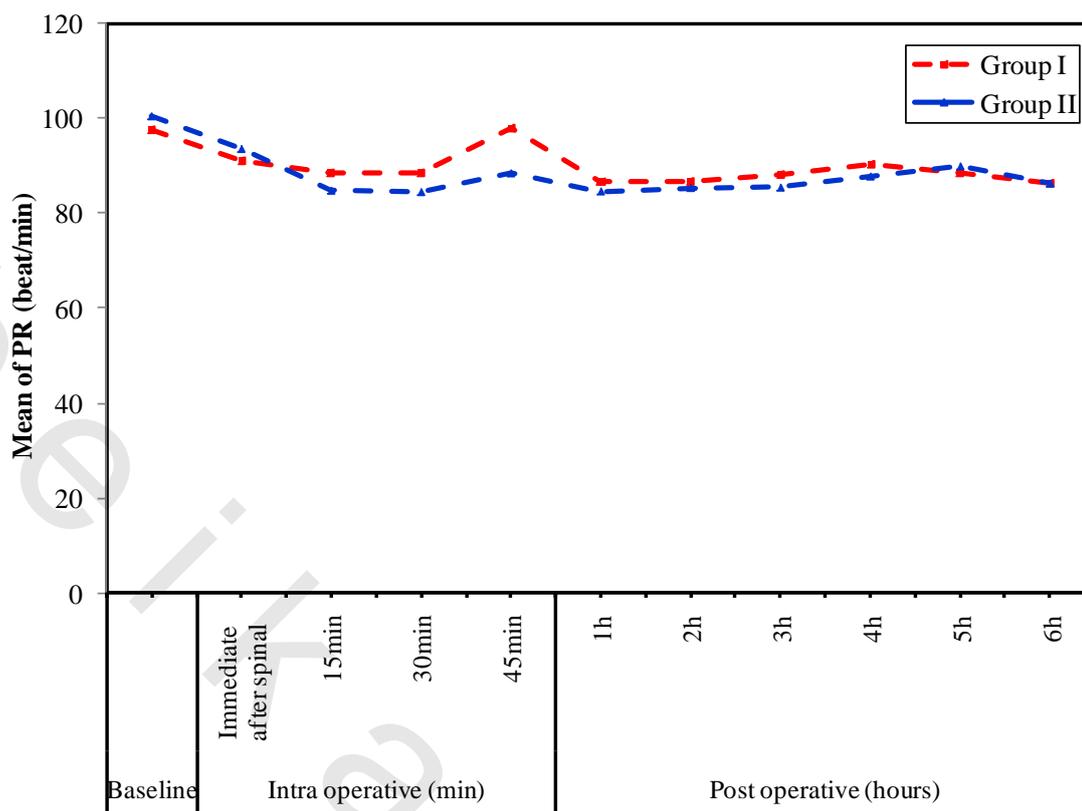
p: Stands for adjusted Bonferroni p-value for ANOVA with repeated measures for comparison between baseline with each other period

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

**Table VIII: Comparison between the two studied groups as regards the changes in Heart rate (beat/min).**

|                 | Heart rate (beat/min) |                        |            |            |           |                        |            |            |            |            |            |
|-----------------|-----------------------|------------------------|------------|------------|-----------|------------------------|------------|------------|------------|------------|------------|
|                 | Baseline              | Intra operative (min)  |            |            |           | Post operative (hours) |            |            |            |            |            |
|                 |                       | Immediate after spinal | 15min      | 30min      | 45min     | 1h                     | 2h         | 3h         | 4h         | 5h         | 6h         |
| <b>Group I</b>  |                       |                        |            |            |           |                        |            |            |            |            |            |
| Range           | 78.0–125.0            | 72.0– 112.0            | 72.0–110.0 | 76.0–112.0 |           | 74.0–110.0             | 72.0–110.0 | 76.0–108.0 | 76.0–106.0 | 78.0–110.0 | 72.0–106.0 |
| Mean            | 97.76                 | 91.08                  | 88.56      | 88.57      | 98.0      | 87.00                  | 86.68      | 88.36      | 90.52      | 88.52      | 86.48      |
| SD ( ± )        | 11.50                 | 9.74                   | 9.03       | 9.96       |           | 8.19                   | 9.03       | 7.72       | 7.89       | 7.78       | 7.96       |
| <b>Group II</b> |                       |                        |            |            |           |                        |            |            |            |            |            |
| Range           | 82.0–120.0            | 75.0–110.0             | 54.0–105.0 | 56.0–110.0 | 83.0–94.0 | 68.0–102.0             | 66.0–106.0 | 68.0–104.0 | 70.0–102.0 | 78.0–104.0 | 72.0–100.0 |
| Mean            | 100.44                | 93.60                  | 84.88      | 84.58      | 88.50     | 84.72                  | 85.44      | 85.52      | 87.84      | 89.96      | 86.36      |
| SD ( ± )        | 9.77                  | 9.25                   | 11.13      | 11.59      | 7.78      | 8.63                   | 8.91       | 8.36       | 7.93       | 6.84       | 7.21       |
| <b>p</b>        | 0.379                 | 0.353                  | 0.205      | 0.226      | -         | 0.343                  | 0.627      | 0.218      | 0.237      | 0.490      | 0.956      |

p: p value for Student t-test for comparing between the two studied group



**Figure (12): Comparison between the two studied groups as regard the changes in the mean heart rate (beat/min)**

**Changes in the mean arterial blood pressure (mmHg).** (tables IX,X,XI), (figure 13)

**Group I.**

• **Pre operative**

The base-line value of the mean arterial blood pressure (before spinal analgesia) ranged from 78 to 100 with a mean of  $90.32 \pm 5.70$  mmHg.

• **Intra-operative**

Immediately after spinal (n = 20), the mean arterial blood pressure ranged from 56 to 92 with a mean of  $82.48 \pm 10.35$  mmHg.

At 15 min , it ranged from 62 to 92 with a mean of  $82.24 \pm 7.69$  mmHg.

At 30 min , it ranged from 74 to 90 with a mean of  $82.86 \pm 5.00$  mmHg.

At 45 min , the mean arterial blood pressure was 90 mmHg.

• **Postoperative**

After 1 hour , the mean arterial blood pressure ranged from 74 to 92 with a mean of  $83.60 \pm 4.90$  mmHg.

After 2 hours , it ranged from 76 to 94 with a mean of  $84.48 \pm 4.29$  mmHg.

After 3 hours , it ranged from 78 to 92 with a mean of  $87.12 \pm 3.83$  mmHg.

After 4 hours , it ranged from 80 to 94 with a mean of  $87.36 \pm 3.50$  mmHg.

After 5 hours , it ranged from 78 to 92 with a mean of  $85.52 \pm 3.89$  mmHg.

After 6 hours , it ranged from 78 to 92 with a mean of  $85.36 \pm 3.90$  mmHg.

There was significant decrease in mean arterial blood pressure in comparison to base line immediately after spinal, at 15 min, 30 min intraoperatively, and after 1 h, 2 h, 3 h, 4 h, 5 h and 6 h postoperatively.

**Group II.**

• **Pre operative**

The base-line value of the mean arterial blood pressure (before spinal analgesia) ranged from 82 to 102 with a mean of  $92.60 \pm 4.80$  mmHg.

• **Intra-operative**

Immediately after spinal , the mean arterial blood pressure ranged from 74 to 98 with a mean of  $87.16 \pm 6.58$  mmHg.

At 15 min , it ranged from 68 to 92 with a mean of  $82.52 \pm 7.84$  mmHg.

At 30 min , it ranged from 72 to 92 with a mean of  $83.25 \pm 5.14$  mmHg.

At 45 min , it ranged from 76 to 82 with a mean of  $79.0 \pm 4.24$  mmHg.

- **Postoperative**

After 1 hour , the mean arterial blood pressure ranged from 72 to 92 with a mean of  $84.48 \pm 4.74$  mmHg.

After 2 hours , it ranged from 70 to 90 with a mean of  $84.88 \pm 4.04$  mmHg.

After 3 hours , it ranged from 70 to 92 with a mean of  $84.88 \pm 5.57$  mmHg.

After 4 hours , it ranged from 78 to 94 with a mean of  $87.12 \pm 4.28$  mmHg.

After 5 hours , it ranged from 70 to 96 with a mean of  $88.32 \pm 4.68$  mmHg.

After 6 hours , it ranged from 72 to 98 with a mean of  $87.28 \pm 5.22$  mmHg.

There was significant decrease in mean arterial blood pressure in comparison to base line immediately after spinal, at 15 min, 30 min, 45 min intraoperatively, and after 1 h, 2 h, 3 h, 4 h, 5 h and 6 h postoperatively.

**Comparison between both groups.**

There was no significant difference as regards the mean arterial blood pressure before the spinal analgesia "base line" (P value = 0.132), immediately after spinal (P value = 0.062), intra-operative at 15 min (P value = 0.899), 30 min (P value = 0.797), 45 min (inadequate sample in group 1) and post-operative at 1h (P value = 0.522), 2h (P value = 0.736), 3h (P value = 0.104) , 4h (P value = 0.829) , 5h (P value = 0.066) , 6h (P value = 0.148).

Table IX: Changes in mean arterial blood pressure (mmHg) in Group I.

| Parturient no. | Mean arterial blood pressure (mmHg) |                        |           |           |       |                        |           |           |           |           |           |
|----------------|-------------------------------------|------------------------|-----------|-----------|-------|------------------------|-----------|-----------|-----------|-----------|-----------|
|                | Baseline                            | Intra operative (min)  |           |           |       | Post operative (hours) |           |           |           |           |           |
|                |                                     | Immediate after spinal | 15min     | 30min     | 45min | 1h                     | 2h        | 3h        | 4h        | 5h        | 6h        |
| 1              | 88                                  | 84                     | 86        | 86        |       | 82                     | 82        | 82        | 88        | 86        | 82        |
| 2              | 86                                  | 74                     | 76        | 78        |       | 84                     | 84        | 84        | 90        | 88        | 86        |
| 3              | 96                                  | 90                     | 88        |           |       | 86                     | 88        | 84        | 92        | 86        | 86        |
| 4              | 98                                  | 90                     | 84        | 84        |       | 86                     | 86        | 88        | 90        | 86        | 86        |
| 5              | 96                                  | 92                     | 92        |           |       | 92                     | 94        | 92        | 94        | 92        | 92        |
| 6              | 92                                  | 86                     | 84        | 90        |       | 88                     | 88        | 86        | 86        | 92        | 88        |
| 7              | 90                                  | 90                     | 86        | 86        |       | 86                     | 88        | 92        | 86        | 86        | 92        |
| 8              | 100                                 | 88                     | 86        | 88        |       | 90                     | 88        | 92        | 86        | 88        | 88        |
| 9              | 88                                  | 78                     | 66        | 78        |       | 80                     | 82        | 82        | 88        | 84        | 84        |
| 10             | 92                                  | 86                     | 86        | 86        |       | 86                     | 88        | 90        | 86        | 88        | 88        |
| 11             | 88                                  | 86                     | 82        | 82        |       | 78                     | 78        | 86        | 88        | 82        | 82        |
| 12             | 88                                  | 82                     | 84        | 84        |       | 84                     | 86        | 90        | 86        | 86        | 86        |
| 13             | 96                                  | 92                     | 90        | 90        | 90    | 90                     | 88        | 88        | 92        | 90        | 88        |
| 14             | 92                                  | 92                     | 86        | 86        |       | 86                     | 86        | 88        | 92        | 88        | 88        |
| 15             | 88                                  | 82                     | 84        |           |       | 84                     | 84        | 86        | 86        | 84        | 82        |
| 16             | 90                                  | 92                     | 82        |           |       | 82                     | 84        | 88        | 80        | 82        | 82        |
| 17             | 88                                  | 86                     | 82        | 84        |       | 84                     | 84        | 84        | 88        | 82        | 82        |
| 18             | 100                                 | 92                     | 68        | 74        |       | 82                     | 82        | 92        | 86        | 84        | 86        |
| 19             | 78                                  | 56                     | 72        | 74        |       | 74                     | 76        | 78        | 84        | 78        | 78        |
| 20             | 90                                  | 82                     | 62        | 82        |       | 82                     | 80        | 84        | 86        | 82        | 82        |
| 21             | 82                                  | 57                     | 86        | 86        |       | 82                     | 84        | 88        | 88        | 88        | 82        |
| 22             | 90                                  | 85                     | 82        | 78        |       | 90                     | 88        | 92        | 92        | 84        | 88        |
| 23             | 79                                  | 77                     | 86        | 84        |       | 74                     | 88        | 86        | 80        | 78        | 92        |
| 24             | 88                                  | 80                     | 92        | 86        |       | 84                     | 76        | 84        | 86        | 82        | 86        |
| 25             | 95                                  | 63                     | 84        | 74        |       | 74                     | 80        | 92        | 84        | 92        | 78        |
| Range          | 78.0–100.0                          | 56.0–92.0              | 62.0–92.0 | 74.0–90.0 |       | 74.0–92.0              | 76.0–94.0 | 78.0–92.0 | 80.0–94.0 | 78.0–92.0 | 78.0–92.0 |
| Mean           | 90.32                               | 82.48                  | 82.24     | 82.86     | 90.0  | 83.60                  | 84.48     | 87.12     | 87.36     | 85.52     | 85.36     |
| SD (±)         | 5.70                                | 10.35                  | 7.69      | 5.00      |       | 4.90                   | 4.29      | 3.83      | 3.50      | 3.89      | 3.90      |
| p              |                                     | 0.005*                 | 0.029*    | 0.011*    | -     | <0.001*                | 0.010*    | 0.020*    | 0.010*    | 0.022*    | 0.171     |

p<sub>1</sub>: 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 X: Changes in mean arterial blood pressure (mmHg) in Group II.**

| Parturient no. | Mean arterial blood pressure (mmHg) |                        |           |           |           |                        |           |           |           |           |           |
|----------------|-------------------------------------|------------------------|-----------|-----------|-----------|------------------------|-----------|-----------|-----------|-----------|-----------|
|                | Baseline                            | Intra operative (min)  |           |           |           | Post operative (hours) |           |           |           |           |           |
|                |                                     | Immediate after spinal | 15min     | 30min     | 45min     | 1h                     | 2h        | 3h        | 4h        | 5h        | 6h        |
| 1              | 88                                  | 84                     | 70        | 72        | 82        | 84                     | 82        | 84        | 90        | 84        | 86        |
| 2              | 98                                  | 90                     | 78        | 80        |           | 82                     | 80        | 84        | 92        | 86        | 88        |
| 3              | 95                                  | 95                     | 90        | 92        |           | 92                     | 88        | 92        | 86        | 88        | 88        |
| 4              | 102                                 | 98                     | 90        | 86        |           | 86                     | 86        | 90        | 88        | 92        | 90        |
| 5              | 88                                  | 82                     | 84        | 78        |           | 78                     | 84        | 88        | 86        | 86        | 88        |
| 6              | 94                                  | 90                     | 90        |           |           | 92                     | 88        | 88        | 94        | 90        | 90        |
| 7              | 98                                  | 96                     | 88        | 88        |           | 92                     | 90        | 90        | 90        | 96        | 98        |
| 8              | 82                                  | 74                     | 72        | 74        | 76        | 72                     | 70        | 70        | 78        | 70        | 72        |
| 9              | 88                                  | 82                     | 84        | 84        |           | 84                     | 82        | 82        | 88        | 86        | 86        |
| 10             | 90                                  | 86                     | 68        | 86        |           | 86                     | 88        | 90        | 92        | 90        | 88        |
| 11             | 94                                  | 92                     | 92        | 88        |           | 84                     | 82        | 78        | 78        | 92        | 88        |
| 12             | 102                                 | 98                     | 88        | 86        |           | 82                     | 88        | 82        | 80        | 86        | 88        |
| 13             | 92                                  | 90                     | 87        | 86        |           | 86                     | 84        | 86        | 88        | 90        | 88        |
| 14             | 88                                  | 88                     | 86        | 84        |           | 84                     | 86        | 84        | 86        | 88        | 86        |
| 15             | 96                                  | 82                     | 70        | 78        |           | 84                     | 84        | 84        | 82        | 92        | 88        |
| 16             | 88                                  | 84                     | 84        | 82        |           | 86                     | 84        | 84        | 84        | 88        | 86        |
| 17             | 94                                  | 88                     | 84        | 86        |           | 84                     | 86        | 84        | 86        | 90        | 92        |
| 18             | 92                                  | 82                     | 84        | 84        |           | 84                     | 86        | 86        | 86        | 90        | 90        |
| 19             | 94                                  | 88                     | 86        | 86        |           | 86                     | 88        | 86        | 90        | 88        | 88        |
| 20             | 90                                  | 82                     | 82        | 84        |           | 86                     | 88        | 86        | 86        | 92        | 90        |
| 21             | 92                                  | 90                     | 70        | 72        |           | 86                     | 82        | 86        | 88        | 92        | 86        |
| 22             | 94                                  | 96                     | 88        | 88        |           | 78                     | 84        | 70        | 94        | 88        | 72        |
| 23             | 90                                  | 86                     | 92        | 84        |           | 92                     | 86        | 90        | 88        | 86        | 88        |
| 24             | 98                                  | 74                     | 70        | 86        |           | 78                     | 88        | 86        | 88        | 90        | 90        |
| 25             | 88                                  | 82                     | 86        | 84        |           | 84                     | 88        | 92        | 90        | 88        | 88        |
| Range          | 82.0–102.0                          | 74.0–98.0              | 68.0–92.0 | 72.0–92.0 | 76.0–82.0 | 72.0–92.0              | 70.0–90.0 | 70.0–92.0 | 78.0–94.0 | 70.0–96.0 | 72.0–98.0 |
| Mean           | 92.60                               | 87.16                  | 82.52     | 83.25     | 79.00     | 84.48                  | 84.88     | 84.88     | 87.12     | 88.32     | 87.28     |
| SD (±)         | 4.80                                | 6.58                   | 7.84      | 5.14      | 4.24      | 4.74                   | 4.04      | 5.57      | 4.28      | 4.68      | 5.22      |
| <b>p</b>       |                                     | 0.002*                 | <0.001*   | <0.001*   | -         | <0.001*                | <0.001*   | <0.001*   | 0.006*    | 0.006*    | 0.003*    |

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

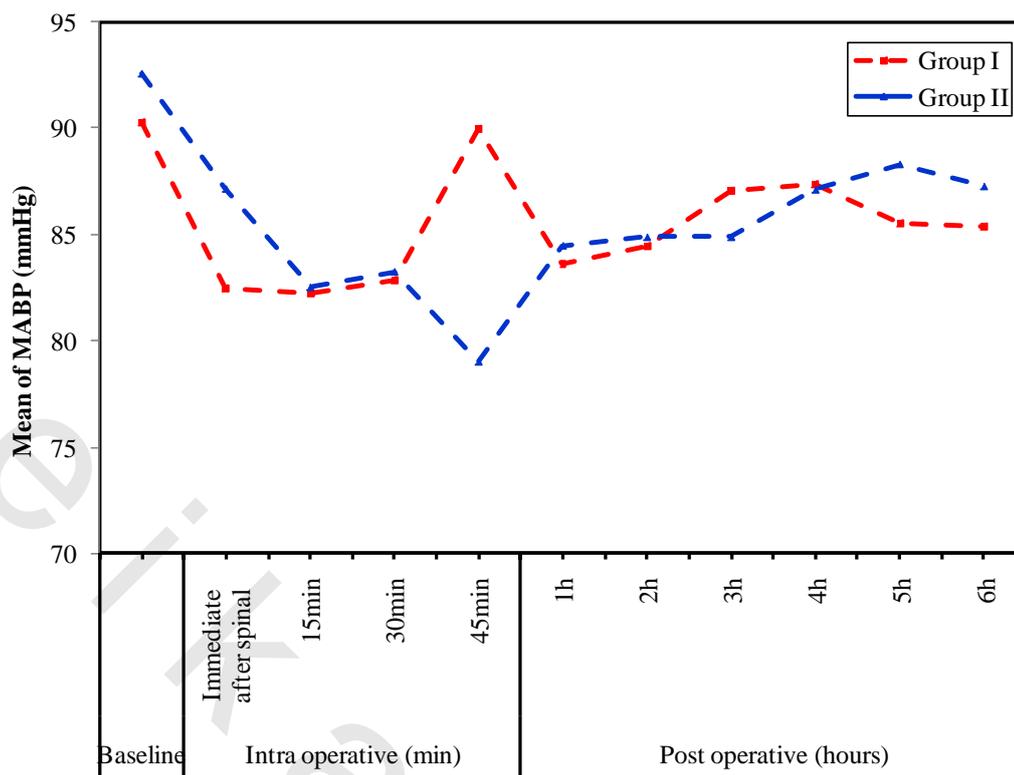
\*: Statistically significant at  $p \leq 0.05$

**Table XI: Comparison between the two studied groups as regards the changes in the mean arterial blood pressure (mmHg).**

|                 | Mean arterial blood pressure (mmHg) |                        |           |           |           |                        |           |           |           |           |           |
|-----------------|-------------------------------------|------------------------|-----------|-----------|-----------|------------------------|-----------|-----------|-----------|-----------|-----------|
|                 | Baseline                            | Intra operative (min)  |           |           |           | Post operative (hours) |           |           |           |           |           |
|                 |                                     | Immediate after spinal | 15min     | 30min     | 45min     | 1h                     | 2h        | 3h        | 4h        | 5h        | 6h        |
| <b>Group I</b>  |                                     |                        |           |           |           |                        |           |           |           |           |           |
| Range           | 78.0–100.0                          | 56.0–92.0              | 62.0–92.0 | 74.0–90.0 |           | 74.0–92.0              | 76.0–94.0 | 78.0–92.0 | 80.0–94.0 | 78.0–92.0 | 78.0–92.0 |
| Mean            | 90.32                               | 82.48                  | 82.24     | 82.86     | 90.0      | 83.60                  | 84.48     | 87.12     | 87.36     | 85.52     | 85.36     |
| SD (±)          | 5.70                                | 10.35                  | 7.69      | 5.00      |           | 4.90                   | 4.29      | 3.83      | 3.50      | 3.89      | 3.90      |
| <b>Group II</b> |                                     |                        |           |           |           |                        |           |           |           |           |           |
| Range           | 82.0–102.0                          | 74.0–98.0              | 68.0–92.0 | 72.0–92.0 | 76.0–82.0 | 72.0–92.0              | 70.0–90.0 | 70.0–92.0 | 78.0–94.0 | 70.0–96.0 | 72.0–98.0 |
| Mean            | 92.60                               | 87.16                  | 82.52     | 83.25     | 79.00     | 84.48                  | 84.88     | 84.88     | 87.12     | 88.32     | 87.28     |
| SD (±)          | 4.80                                | 6.58                   | 7.84      | 5.14      | 4.24      | 4.74                   | 4.04      | 5.57      | 4.28      | 4.68      | 5.22      |
| <b>p</b>        | 0.132                               | 0.062                  | 0.899     | 0.797     | -         | 0.522                  | 0.736     | 0.104     | 0.829     | 0.066     | 0.148     |

p: p value for Student t-test for comparing between the two studied group

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



**Figure (13):** Comparison between the two studied groups as regard the mean changes of the mean arterial blood pressure (mmHg).

**Changes in the percentage of oxygen saturation (SpO<sub>2</sub>%).**(tables XII-XIV), (figure 14)

**Group I.**

• **Pre operative**

The base-line value of oxygen saturation percentatge (before spinal analgesia) ranged from 97% to 100 %, with a mean of  $99.48 \pm 0.65\%$ .

• **Intra-operative**

Immediately after spinal anaesthesia,the oxygen saturation percentage ranged from 99% to 100%, with a mean of  $99.36 \pm 0.64\%$ .

At 15 min , it ranged from 98% to 100%, with a mean of  $99.48 \pm 0.65\%$

At 30 min , it ranged from 98% to 100%, with a mean of  $99.38 \pm 0.67\%$ .

At 45 min , the oxygen saturation percentage was 99%.

• **Postoperative**

After 1 hour , the oxygen saturation percentage ranged from 98% to 100%, with a mean of  $99.44 \pm 0.65\%$ .

After 2 hours , it ranged from 99% to 100%, with a mean of  $99.44 \pm 0.71\%$ .

After 3 hours , it ranged from 99 to 100%, with a mean of  $99.48 \pm 0.65\%$ .

After 4 hours , it ranged from 98% to 100%, with a mean of  $99.40 \pm 0.76\%$ .

After 5 hours ,it ranged from 99 to 100%, with a mean of  $99.48 \pm 0.71\%$ .

After 6 hours , it ranged from 99 to 100%, with a mean of  $99.52 \pm 0.65\%$ .

There was no significant difference regarding oxygen saturation percentage in comparison to base line immediately after spinal,at 15 min,30 min,45 min intraoperatively,after 1 h,2 h,3 h,4 h,5 h and 6 h postoperatively.

**Group II.**

• **Pre operative**

The base-line value of the oxygen saturation percentage (before spinal analgesia) ranged from 97% to 100%, with a mean of  $99.48 \pm 0.82\%$ .

• **Intra-operative**

Immediately after spinal anaesthesia,the oxygen saturation percentage ranged from 98 to 100%, with a mean of  $99.40 \pm 0.76\%$ .

At 15 min , it ranged from 97% to 100%, with a mean of  $99.32 \pm 0.90\%$ .

At 30 min , it ranged from 97 % to 100%, with a mean of  $99.25 \pm 0.79\%$ .

At 45 min , it ranged from 97 % to 100%, with a mean of  $99.50 \pm 0.71\%$ .

- **Postoperative**

After 1 hour , the oxygen saturation percentage ranged from 98 % to 100%, with a mean of  $99.48 \pm 0.65\%$ .

After 2 hours ,it ranged from 99 % to 100%, with a mean of  $99.56 \pm 0.58\%$ .

After 3 hours , it ranged from 99 % to 100%, with a mean of  $99.44 \pm 0.71\%$ .

After 4 hours , it ranged from 99 % to 100%, with a mean of  $99.64 \pm 0.49\%$ .

After 5 hours ,it ranged from 99 % to 100%, with a mean of  $99.52 \pm 0.65\%$ .

After 6 hours , ranged from 99 % to 100%, with a mean of  $99.64 \pm 0.57\%$ .

There was no significant difference regarding oxygen saturation percentage in comparison to base line immediately after spinal anaesthesia, at 15 min, 30 min, 45 min intraoperatively, and after 1 h, 2 h, 3 h, 4 h, 5 h and 6 h postoperatively .

**Comparison between both groups.**

There was no significant difference as regards percentage of oxygen saturation before the spinal analgesia "base line" (P value = 1.000), Immediate after spinal analgesia (P value = 0.842), intra-operative at 15 min (P value = 0.475), 30 min (P value = 0.556), and post-operative at 1h (P value = 0.829), 2h (P value = 0.517), 3h (P value = 0.837) , 4h (P value = 0.192) , 5h (P value = 0.837) , 6h (P value = 0.492).

Table XII: Changes in oxygen saturation percentage (SpO<sub>2</sub> %) in Group I.

| Parturient no. | Oxygen saturation percentage (SpO <sub>2</sub> %) |                        |            |            |       |                        |            |            |            |            |            |
|----------------|---|------------------------|------------|------------|-------|------------------------|------------|------------|------------|------------|------------|
|                | Baseline  | Intra operative (min)  |            |            |       | Post operative (hours) |            |            |            |            |            |
|                |   | Immediate after spinal | 15min      | 30min      | 45min | 1h                     | 2h         | 3h         | 4h         | 5h         | 6h         |
| 1              | 100   | 100                    | 100        | 100        |       | 100                    | 100        | 100        | 100        | 100        | 100        |
| 2              | 99  | 99                     | 99         | 99         |       | 99                     | 99         | 99         | 99         | 99         | 99         |
| 3              | 100   | 100                    | 100        |            |       | 100                    | 100        | 100        | 100        | 100        | 100        |
| 4              | 100   | 100                    | 100        | 100        |       | 100                    | 100        | 100        | 100        | 100        | 100        |
| 5              | 100   | 100                    | 100        |            |       | 100                    | 100        | 100        | 100        | 100        | 100        |
| 6              | 100   | 100                    | 100        | 100        |       | 100                    | 100        | 100        | 100        | 100        | 100        |
| 7              | 99  | 99                     | 98         | 98         |       | 99                     | 99         | 99         | 98         | 98         | 98         |
| 8              | 100   | 100                    | 100        | 100        |       | 100                    | 100        | 100        | 100        | 100        | 100        |
| 9              | 99  | 99                     | 99         | 100        |       | 99                     | 99         | 99         | 98         | 100        | 100        |
| 10             | 100   | 100                    | 100        | 100        |       | 100                    | 100        | 100        | 100        | 100        | 100        |
| 11             | 100   | 99                     | 99         | 99         |       | 99                     | 100        | 99         | 99         | 99         | 99         |
| 12             | 99  | 99                     | 99         | 99         |       | 98                     | 99         | 99         | 99         | 99         | 99         |
| 13             | 98  | 99                     | 99         | 99         | 99    | 99                     | 99         | 99         | 99         | 99         | 99         |
| 14             | 99  | 99                     | 100        | 100        |       | 99                     | 99         | 100        | 100        | 100        | 100        |
| 15             | 100   | 100                    | 100        |            |       | 100                    | 100        | 100        | 100        | 100        | 100        |
| 16             | 100   | 100                    | 100        |            |       | 100                    | 100        | 100        | 100        | 100        | 100        |
| 17             | 99  | 100                    | 100        | 100        |       | 100                    | 100        | 100        | 100        | 100        | 100        |
| 18             | 100   | 99                     | 99         | 99         |       | 99                     | 99         | 99         | 99         | 99         | 99         |
| 19             | 98  | 99                     | 99         | 99         |       | 98                     | 98         | 98         | 98         | 98         | 98         |
| 20             | 99  | 100                    | 99         | 99         |       | 100                    | 100        | 100        | 100        | 100        | 100        |
| 21             | 99  | 98                     | 100        | 100        |       | 99                     | 100        | 99         | 98         | 100        | 100        |
| 22             | 100   | 99                     | 100        | 99         |       | 100                    | 98         | 99         | 99         | 99         | 99         |
| 23             | 100   | 98                     | 99         | 98         |       | 100                    | 98         | 98         | 100        | 98         | 100        |
| 24             | 99  | 99                     | 98         | 99         |       | 99                     | 100        | 100        | 99         | 100        | 99         |
| 25             | 100   | 99                     | 100        | 100        |       | 99                     | 99         | 100        | 100        | 99         | 99         |
| Range          | 98.0–100.0  | 98.0–100.0             | 98.0–100.0 | 98.0–100.0 |       | 98.0–100.0             | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 |
| Mean           | 99.48   | 99.36                  | 99.48      | 99.38      | 99.0  | 99.44                  | 99.44      | 99.48      | 99.40      | 99.48      | 99.52      |
| SD ( ± )       | 0.65  | 0.64                   | 0.65       | 0.67       |       | 0.65                   | 0.71       | 0.65       | 0.76       | 0.71       | 0.65       |
| p              |   | 1.000                  | 1.000      | 1.000      | -     | 1.000                  | 1.000      | 1.000      | 1.000      | 1.000      | 1.000      |

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

Table XIII: Changes in oxygen saturation percentage (SpO<sub>2</sub> %) in Group II.

| Parturient no. | Oxygen saturation percentage (SpO <sub>2</sub> %) |                        |            |            |            |                        |            |            |            |            |            |
|----------------|---|------------------------|------------|------------|------------|------------------------|------------|------------|------------|------------|------------|
|                | Baseline  | Intra operative (min)  |            |            |            | Post operative (hours) |            |            |            |            |            |
|                |   | Immediate after spinal | 15min      | 30min      | 45min      | 1h                     | 2h         | 3h         | 4h         | 5h         | 6h         |
| 1              | 100   | 100                    | 99         | 99         | 100        | 100                    | 100        | 100        | 99         | 99         | 99         |
| 2              | 100   | 99                     | 100        | 99         |            | 99                     | 100        | 100        | 100        | 100        | 100        |
| 3              | 100   | 100                    | 100        | 100        |            | 100                    | 100        | 100        | 100        | 100        | 100        |
| 4              | 100   | 100                    | 100        | 100        |            | 100                    | 100        | 100        | 100        | 100        | 100        |
| 5              | 100   | 100                    | 100        | 100        |            | 100                    | 100        | 100        | 100        | 100        | 100        |
| 6              | 98  | 99                     | 99         |            |            | 100                    | 100        | 99         | 99         | 99         | 99         |
| 7              | 100   | 98                     | 97         | 99         |            | 99                     | 99         | 99         | 99         | 99         | 99         |
| 8              | 100   | 99                     | 99         | 99         | 99         | 99                     | 100        | 100        | 100        | 100        | 100        |
| 9              | 100   | 100                    | 100        | 100        |            | 100                    | 100        | 100        | 100        | 100        | 100        |
| 10             | 99  | 100                    | 99         | 99         |            | 100                    | 99         | 99         | 100        | 100        | 100        |
| 11             | 100   | 100                    | 100        | 100        |            | 100                    | 100        | 99         | 100        | 99         | 100        |
| 12             | 100   | 100                    | 100        | 98         |            | 99                     | 99         | 99         | 99         | 99         | 99         |
| 13             | 100   | 100                    | 100        | 100        |            | 100                    | 100        | 100        | 100        | 100        | 100        |
| 14             | 100   | 100                    | 100        | 100        |            | 100                    | 100        | 100        | 100        | 100        | 100        |
| 15             | 97  | 98                     | 99         | 99         |            | 99                     | 99         | 99         | 99         | 100        | 100        |
| 16             | 99  | 99                     | 99         | 99         |            | 99                     | 99         | 99         | 99         | 99         | 99         |
| 17             | 100   | 100                    | 100        | 100        |            | 100                    | 100        | 100        | 100        | 100        | 100        |
| 18             | 100   | 100                    | 100        | 100        |            | 98                     | 99         | 100        | 100        | 100        | 100        |
| 19             | 99  | 99                     | 97         | 97         |            | 99                     | 100        | 100        | 100        | 100        | 100        |
| 20             | 99  | 99                     | 100        | 100        |            | 100                    | 100        | 100        | 100        | 100        | 100        |
| 21             | 100   | 100                    | 98         | 99         |            | 99                     | 99         | 98         | 99         | 99         | 98         |
| 22             | 99  | 98                     | 99         | 99         |            | 100                    | 99         | 98         | 100        | 98         | 99         |
| 23             | 100   | 99                     | 99         | 98         |            | 99                     | 100        | 100        | 99         | 98         | 100        |
| 24             | 99  | 98                     | 100        | 99         |            | 100                    | 98         | 99         | 99         | 99         | 99         |
| 25             | 98  | 100                    | 99         | 99         |            | 98                     | 99         | 98         | 100        | 100        | 100        |
| Range          | 97.0–100.0  | 98.0–100.0             | 97.0–100.0 | 97.0–100.0 | 99.0–100.0 | 98.0–100.0             | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 |
| Mean           | 99.48   | 99.40                  | 99.32      | 99.25      | 99.50      | 99.48                  | 99.56      | 99.44      | 99.64      | 99.52      | 99.64      |
| SD ( ± )       | 0.82  | 0.76                   | 0.90       | 0.79       | 0.71       | 0.65                   | 0.58       | 0.71       | 0.49       | 0.65       | 0.57       |
| p              |   | 1.000                  | 1.000      | 1.000      | -          | 1.000                  | 1.000      | 1.000      | 1.000      | 1.000      | 1.000      |

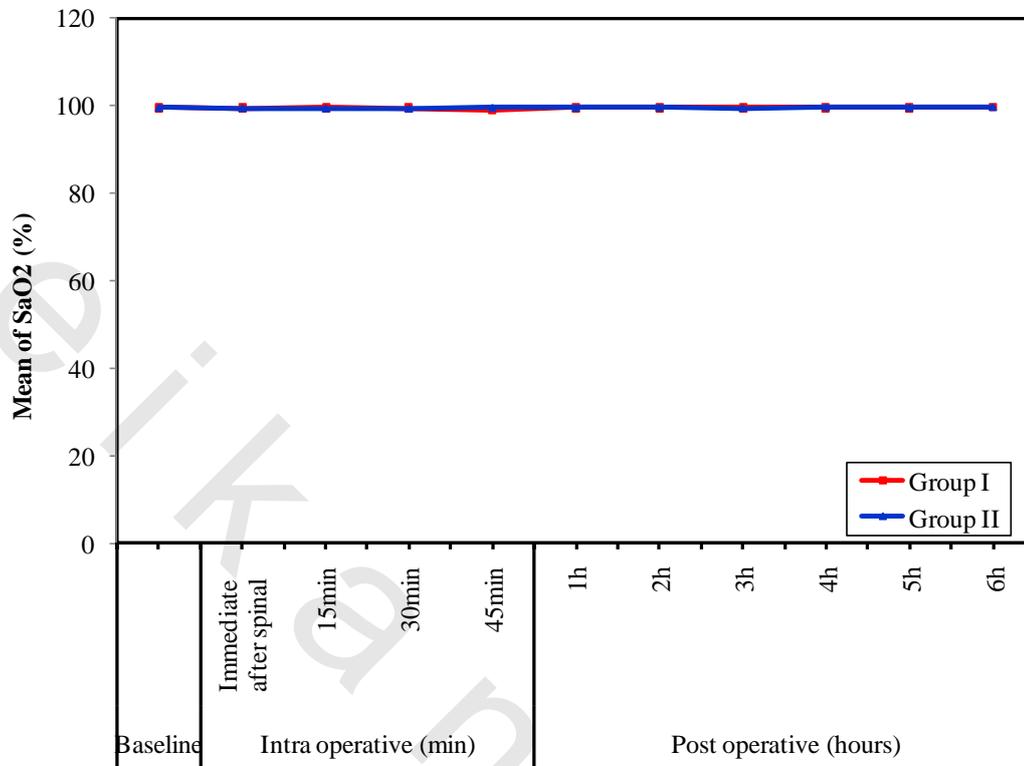
p: Stands for adjusted Bonferroni p-value for ANOVA with repeated measures for comparison between baseline with each other period

**Table XIV: Comparison between the two studied groups as regards the changes in oxygen saturation percentage (SpO<sub>2</sub> %).**

|                 | Oxygen saturation percentage (SpO <sub>2</sub> %) |                        |            |            |            |                        |            |            |            |            |            |
|-----------------|---|------------------------|------------|------------|------------|------------------------|------------|------------|------------|------------|------------|
|                 | Baseline  | Intra operative (min)  |            |            |            | Post operative (hours) |            |            |            |            |            |
|                 |   | Immediate after spinal | 15min      | 30min      | 45min      | 1h                     | 2h         | 3h         | 4h         | 5h         | 6h         |
| <b>Group I</b>  |   |                        |            |            |            |                        |            |            |            |            |            |
| Range           | 98.0–100.0  | 98.0–100.0             | 98.0–100.0 | 98.0–100.0 |            | 98.0–100.0             | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 |
| Mean            | 99.48   | 99.36                  | 99.48      | 99.38      | 99.0       | 99.44                  | 99.44      | 99.48      | 99.40      | 99.48      | 99.52      |
| SD ( ± )        | 0.65  | 0.64                   | 0.65       | 0.67       |            | 0.65                   | 0.71       | 0.65       | 0.76       | 0.71       | 0.65       |
| <b>Group II</b> |   |                        |            |            |            |                        |            |            |            |            |            |
| Range           | 97.0–100.0  | 98.0–100.0             | 97.0–100.0 | 97.0–100.0 | 99.0–100.0 | 98.0–100.0             | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 | 98.0–100.0 |
| Mean            | 99.48   | 99.40                  | 99.32      | 99.25      | 99.50      | 99.48                  | 99.56      | 99.44      | 99.64      | 99.52      | 99.64      |
| SD ( ± )        | 0.82  | 0.76                   | 0.90       | 0.79       | 0.71       | 0.65                   | 0.58       | 0.71       | 0.49       | 0.65       | 0.57       |
| <b>p</b>        | 1.000   | 0.842                  | 0.475      | 0.556      | -          | 0.829                  | 0.517      | 0.837      | 0.192      | 0.837      | 0.492      |

p: p value for Student t-test for comparing between the two studied group

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



**Figure (14): Comparison between the two studied group as regard the changes in the mean of the oxygen saturation percentage (SpO2 %).**

**Assessment of sensation:**

**The time of onset of sensory analgesia (min).** (table XV), (figure 15)

**Group I.**

Onset of analgesia ranged between 2 and 5 min, with a mean of  $3.44 \pm 0.87$  min.

**Group II.**

Onset of analgesia ranged between 1 and 4 min, with a mean of  $2.44 \pm 0.65$  min.

**Comparison between both groups.**

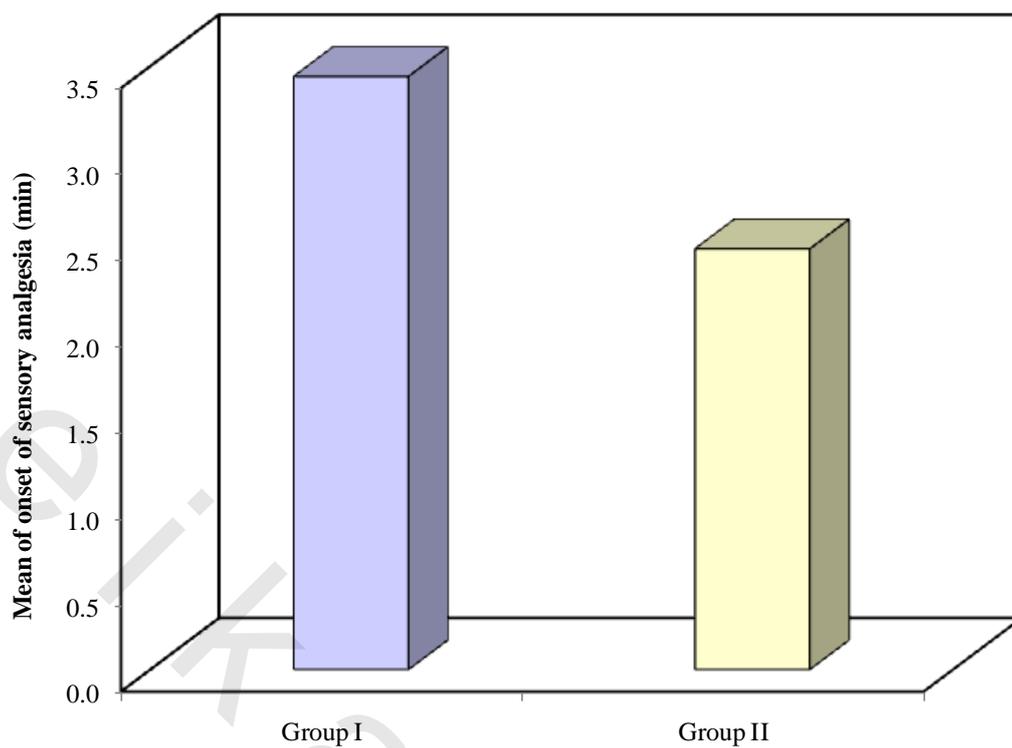
By comparing the two studied groups, there was a significant difference between both groups, with faster onset of analgesia in Group II (P value < 0.001).

**Table XV: Comparison between the two studied groups as regard the time of onset of sensory analgesia (min).**

| Parturient no. | Time of onset of sensory analgesia (min) |           |
|----------------|--|-----------|
|                | Group I                                  | Group II  |
| 1              | 3  | 2         |
| 2              | 4  | 2         |
| 3              | 4  | 2         |
| 4              | 4  | 2         |
| 5              | 3  | 1         |
| 6              | 4  | 2         |
| 7              | 3  | 2         |
| 8              | 3  | 2         |
| 9              | 5  | 3         |
| 10             | 3  | 3         |
| 11             | 2  | 3         |
| 12             | 4  | 2         |
| 13             | 3  | 2         |
| 14             | 5  | 4         |
| 15             | 4  | 3         |
| 16             | 4  | 3         |
| 17             | 5  | 2         |
| 18             | 2  | 3         |
| 19             | 3  | 3         |
| 20             | 3  | 2         |
| 21             | 3  | 3         |
| 22             | 4  | 3         |
| 23             | 3  | 2         |
| 24             | 2  | 3         |
| 25             | 3  | 2         |
| Range          | 2.0 – 5.0                                | 1.0 – 4.0 |
| Mean           | 3.44                                     | 2.44      |
| SD ( ± )       | 0.87                                     | 0.65      |
| <b>p</b>       | <b>&lt;0.001*</b>                        |           |

p: p value for Student t-test for comparing between the two studied group

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



**Figure (15): Comparison between the two studied groups as regard the mean time of onset of sensory analgesia (min).**

**The segmental level of highest sensory analgesia.** (tables XVI), (figures 16)

**Group I.**

Sensory level of analgesia ranged between T4 and T8, 24% with T4 level, 4% with T5 level , 28% with T6 level, 20% with T7 level and 24% with T8 level.

**Group II.**

Sensory level of analgesia ranged between T4 and T8, 60% with T4 level, 12% with T5 level , 20% with T6 level, 4% with T7 level and 4% with T8 level.

**Comparison between both groups.**

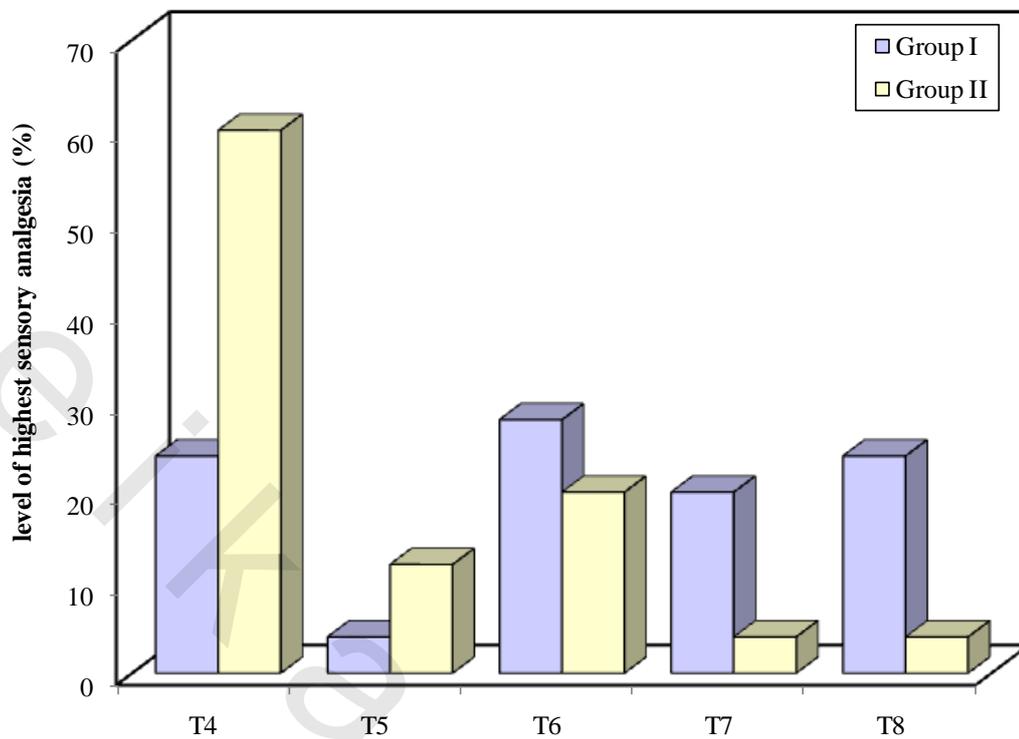
The readings showed a significant difference between both groups, with highest segmental level of analgesia in Group II(P value < 0.019).

**Table XVI: Comparison between the two studied groups as regard the segmental level of highest sensory analgesia.**

| Parturient no.         | Segmental level |          |            |          |
|------------------------|-----------------|----------|------------|----------|
|                        | Group I         |          | Group II   |          |
| 1                      | T6              |          | T6         |          |
| 2                      | T6              |          | T4         |          |
| 3                      | T7              |          | T4         |          |
| 4                      | T7              |          | T4         |          |
| 5                      | T8              |          | T6         |          |
| 6                      | T6              |          | T5         |          |
| 7                      | T4              |          | T8         |          |
| 8                      | T6              |          | T6         |          |
| 9                      | T8              |          | T4         |          |
| 10                     | T8              |          | T5         |          |
| 11                     | T4              |          | T4         |          |
| 12                     | T5              |          | T6         |          |
| 13                     | T6              |          | T4         |          |
| 14                     | T4              |          | T4         |          |
| 15                     | T8              |          | T4         |          |
| 16                     | T7              |          | T4         |          |
| 17                     | T6              |          | T7         |          |
| 18                     | T7              |          | T4         |          |
| 19                     | T4              |          | T4         |          |
| 20                     | T8              |          | T4         |          |
| 21                     | T6              |          | T4         |          |
| 22                     | T8              |          | T6         |          |
| 23                     | T4              |          | T4         |          |
| 24                     | T7              |          | T5         |          |
| 25                     | T4              |          | T4         |          |
|                        | <b>No.</b>      | <b>%</b> | <b>No.</b> | <b>%</b> |
| <b>T4</b>              | 6               | 24.0     | 15         | 60.0     |
| <b>T5</b>              | 1               | 4.0      | 3          | 12.0     |
| <b>T6</b>              | 7               | 28.0     | 5          | 20.0     |
| <b>T7</b>              | 5               | 20.0     | 1          | 4.0      |
| <b>T8</b>              | 6               | 24.0     | 1          | 4.0      |
| <sup>MC</sup> <b>p</b> | 0.019*          |          |            |          |

<sup>MC</sup>p: p value for Monte Carlo test for comparing between the two studied group

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



**Figure (16):** Comparison between the two studied groups as regard the percentage of the segmental level of highest sensory analgesia.

**The duration of analgesia (duration taken by sensory level to regress to T12 (min)).**  
(table XVII), (figure 17)

**Group I.**

The duration taken by sensory level to regress to T12 ranged between 165 and 240 min with a mean of  $195.60 \pm 17.04$  min.

**Group II.**

The duration taken by sensory level to regress to T12 ranged between 180 and 315 min with a mean of  $254.80 \pm 31.04$  min.

**Comparison between both groups.**

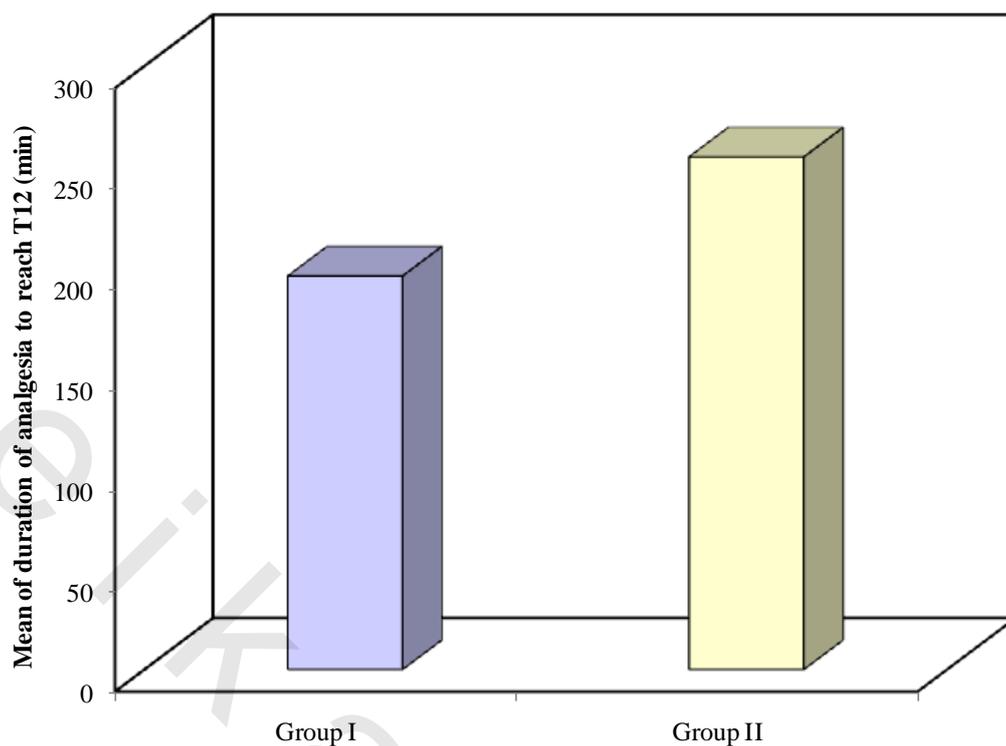
The readings showed a significant difference between both groups, with longer duration of analgesia in Group II (P value  $<0.001$ ).

**Table XVII: Comparison between the two studied groups as regard the duration taken by sensory level to regress to T12 (min).**

| Parturient no. | Duration of analgesia to reach T12 (min) |               |
|----------------|--|---------------|
|                | Group I                                  | Group II      |
| 1              | 195                                      | 270           |
| 2              | 210                                      | 210           |
| 3              | 195                                      | 270           |
| 4              | 180                                      | 315           |
| 5              | 210                                      | 180           |
| 6              | 210                                      | 210           |
| 7              | 165                                      | 255           |
| 8              | 180                                      | 270           |
| 9              | 210                                      | 255           |
| 10             | 195                                      | 255           |
| 11             | 195                                      | 255           |
| 12             | 240                                      | 240           |
| 13             | 210                                      | 255           |
| 14             | 180                                      | 270           |
| 15             | 195                                      | 255           |
| 16             | 180                                      | 270           |
| 17             | 195                                      | 255           |
| 18             | 210                                      | 285           |
| 19             | 195                                      | 255           |
| 20             | 210                                      | 300           |
| 21             | 180                                      | 270           |
| 22             | 165                                      | 190           |
| 23             | 210                                      | 285           |
| 24             | 195                                      | 240           |
| 25             | 180                                      | 255           |
| Range          | 165.0 – 240.0                            | 180.0 – 315.0 |
| Mean           | 195.60                                   | 254.80        |
| SD (±)         | 17.04                                    | 31.04         |
| <b>p</b>       | <b>&lt;0.001*</b>                        |               |

p: p value for Student t-test for comparing between the two studied group

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



**Figure (17): Comparison between the two studied groups as regard the mean duration taken by sensory level to regress to T12 (min).**

**Changes in pain intensity (VAS):** (tables XVIII-XX), (figure 18)

**Group I.**

• **Pre operative**

The base-line value of VAS (before spinal analgesia) ranged from 3.0 to 5.0, with a mean of  $4.24 \pm 0.72$

• **Intra-operative**

Immediately after spinal, it ranged from 3.0 to 5.0, with a mean of  $3.88 \pm 0.78$ .

At 15 min , it ranged from 1 to 4, with a mean of  $3.08 \pm 0.57$ .

At 30 min , it ranged from 3 to 4, with a mean of  $3.24 \pm 0.44$ .

At 45 min ,VAS was 4.

• **Postoperative**

After 1 hour , it ranged from 2 to 4, with a mean of  $3.04 \pm 0.45$ .

After 2 hours ,it ranged from 2 to 4, with a mean of  $3.12 \pm 0.53$ .

After 3 hours , it ranged from 3 to 6, with a mean of  $3.68 \pm 0.80$ .

After 4 hours , it ranged from 3 to 5, with a mean of  $3.92 \pm 0.49$ .

After 5 hours , it ranged from 3 to 5, with a mean of  $3.68 \pm 0.63$ .

After 6 hours , it ranged from 3 to 5, with a mean of  $3.64 \pm 0.64$ .

There was significant difference regarding changes in pain intensity using (VAS) in comparison to base line immediately after spinal,at 15 min,30 min intraoperatively,after 1 h,2 h,3 h,4 h,5 h and 6 h postoperatively with significant decrease in (VAS) .

**Group II.**

• **Pre operative**

The base-line value of VAS (before spinal analgesia) ranged from 3 to 6, with a mean of  $4.00 \pm 0.76$ .

• **Intra-operative**

Immediately after spinal , it ranged from 2 to 6, with a mean of  $3.76 \pm 0.83$ .

At 15 min , it ranged from 0 to 4, with a mean of  $2.24 \pm 0.88$ .

At 30 min , it ranged from 0 to 4, with a mean of  $2.17 \pm 0.87$ .

At 45 min , it was 2, with a mean of  $2.0 \pm 0.0$ .

- **Postoperative**

After 1 hour , it ranged from 0 to 4, with a mean of  $2.40 \pm 0.91$ .

After 2 hours , it ranged from 0 to 5, with a mean of  $2.48 \pm 1.00$ .

After 3 hours , it ranged from 1 to 5, with a mean of  $2.84 \pm 0.94$ .

After 4 hours , it ranged from 2 to 5, with a mean of  $3.52 \pm 0.82$ .

After 5 hours , it ranged from 2 to 5, with a mean of  $4.00 \pm 0.87$ .

After 6 hours , it ranged from 2 to 5, with a mean of  $3.80 \pm 0.76$ .

There was significant difference regarding changes in pain intensity using (VAS) in comparison to base line immediately after spinal,at 15 min,30 min,45 min intraoperatively,after 1 h,2 h,3 h,4 h,5 h and 6 h postoperatively with decrease in (VAS) .

**Comparison between both groups.**

The readings showed no significant difference as regard the pain intensity between both groups from base line (P value = 0.187),immediately after spinal (P value = 0.594),15 min (P value = 0.071),30 min (P value = <0.061) intraoperatively,and significant decrease 1 h (P value = 0.002),2 h (P value = 0.002),3 h (P value = 0.002),4 h (P value = 0.035),5 h (P value = 0.041),6 h (P value = 0.024) postoperatively with less pain intensity (VAS) in group II.

**Table XVIII: Changes in pain intensity by Visual Analogue Scale (VAS) in Group I.**

| Parturient no. | Pain intensity (VAS) |                        |         |         |       |                        |         |         |         |         |         |
|----------------|----------------------|------------------------|---------|---------|-------|------------------------|---------|---------|---------|---------|---------|
|                | Baseline             | Intra operative (min)  |         |         |       | Post operative (hours) |         |         |         |         |         |
|                |                      | Immediate after spinal | 15min   | 30min   | 45min | 1h                     | 2h      | 3h      | 4h      | 5h      | 6h      |
| 1              | 5                    | 5                      | 4       | 4       |       | 4                      | 4       | 6       | 4       | 4       | 4       |
| 2              | 4                    | 4                      | 3       | 3       |       | 3                      | 3       | 4       | 4       | 4       | 4       |
| 3              | 5                    | 4                      | 3       |         |       | 3                      | 3       | 3       | 5       | 3       | 3       |
| 4              | 5                    | 4                      | 3       | 3       |       | 3                      | 3       | 3       | 4       | 3       | 3       |
| 5              | 4                    | 3                      | 3       |         |       | 3                      | 3       | 3       | 4       | 5       | 4       |
| 6              | 5                    | 5                      | 3       | 3       |       | 3                      | 3       | 3       | 4       | 4       | 4       |
| 7              | 5                    | 5                      | 3       | 3       |       | 3                      | 4       | 5       | 4       | 4       | 5       |
| 8              | 4                    | 3                      | 3       | 3       |       | 3                      | 3       | 4       | 4       | 3       | 3       |
| 9              | 4                    | 4                      | 3       | 3       |       | 3                      | 3       | 3       | 4       | 4       | 4       |
| 10             | 4                    | 4                      | 3       | 3       |       | 3                      | 3       | 4       | 4       | 4       | 4       |
| 11             | 4                    | 3                      | 3       | 3       |       | 3                      | 3       | 3       | 4       | 3       | 3       |
| 12             | 3                    | 3                      | 3       | 3       |       | 3                      | 3       | 3       | 4       | 3       | 3       |
| 13             | 5                    | 5                      | 4       | 4       | 4     | 4                      | 4       | 4       | 5       | 5       | 5       |
| 14             | 4                    | 4                      | 3       | 3       |       | 3                      | 3       | 3       | 3       | 3       | 3       |
| 15             | 3                    | 3                      | 1       |         |       | 2                      | 2       | 4       | 4       | 4       | 4       |
| 16             | 5                    | 4                      | 3       |         |       | 3                      | 3       | 4       | 4       | 4       | 4       |
| 17             | 5                    | 5                      | 3       | 3       |       | 3                      | 3       | 3       | 3       | 3       | 3       |
| 18             | 3                    | 3                      | 3       | 3       |       | 3                      | 3       | 4       | 3       | 3       | 3       |
| 19             | 5                    | 4                      | 4       | 4       |       | 4                      | 4       | 4       | 4       | 4       | 4       |
| 20             | 5                    | 5                      | 3       | 3       |       | 3                      | 3       | 3       | 4       | 4       | 4       |
| 21             | 4                    | 4                      | 3       | 4       |       | 3                      | 3       | 3       | 4       | 3       | 3       |
| 22             | 4                    | 3                      | 3       | 3       |       | 3                      | 2       | 4       | 4       | 4       | 4       |
| 23             | 3                    | 3                      | 4       | 3       |       | 3                      | 3       | 4       | 4       | 3       | 3       |
| 24             | 4                    | 4                      | 3       | 3       |       | 2                      | 4       | 3       | 3       | 4       | 4       |
| 25             | 4                    | 3                      | 3       | 4       |       | 3                      | 3       | 5       | 4       | 4       | 3       |
| Range          | 3.0–5.0              | 3.0–5.0                | 1.0–4.0 | 3.0–4.0 |       | 2.0–4.0                | 2.0–4.0 | 3.0–6.0 | 3.0–5.0 | 3.0–5.0 | 3.0–5.0 |
| Mean           | 4.24                 | 3.88                   | 3.08    | 3.24    | 4.0   | 3.04                   | 3.12    | 3.68    | 3.92    | 3.68    | 3.64    |
| SD ( ± )       | 0.72                 | 0.78                   | 0.57    | 0.44    |       | 0.45                   | 0.53    | 0.80    | 0.49    | 0.63    | 0.64    |
| Median         | 4.00                 | 4.00                   | 3.00    | 3.00    |       | 3.00                   | 3.00    | 4.00    | 4.00    | 4.00    | 4.00    |
| <b>p</b>       |                      | 0.003*                 | <0.001* | <0.001* | -     | <0.001*                | <0.001* | 0.015*  | 0.046*  | 0.005*  | 0.002*  |

p:p value for Wilcoxon signed ranks test for comparing between Baseline and each other periods

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

**Table XIX: Changes in Pain intensity by Visual Analogue Scale (VAS) in Group II.**

| Parturient no. | Pain intensity (VAS) |                        |         |         |         |                        |         |         |         |         |         |
|----------------|----------------------|------------------------|---------|---------|---------|------------------------|---------|---------|---------|---------|---------|
|                | Baseline             | Intra operative (min)  |         |         |         | Post operative (hours) |         |         |         |         |         |
|                |                      | Immediate after spinal | 15min   | 30min   | 45min   | 1h                     | 2h      | 3h      | 4h      | 5h      | 6h      |
| 1              | 4                    | 3                      | 2       | 2       | 2       | 2                      | 2       | 2       | 4       | 2       | 3       |
| 2              | 3                    | 3                      | 2       | 2       |         | 3                      | 3       | 3       | 4       | 3       | 3       |
| 3              | 3                    | 2                      | 2       | 2       |         | 2                      | 2       | 2       | 3       | 4       | 2       |
| 4              | 6                    | 6                      | 0       | 0       |         | 0                      | 0       | 2       | 2       | 2       | 4       |
| 5              | 3                    | 3                      | 1       | 1       |         | 4                      | 5       | 5       | 4       | 4       | 4       |
| 6              | 4                    | 4                      | 2       |         |         | 2                      | 2       | 4       | 4       | 4       | 4       |
| 7              | 4                    | 4                      | 3       | 3       |         | 4                      | 4       | 4       | 5       | 4       | 4       |
| 8              | 5                    | 4                      | 2       | 2       | 2       | 2                      | 2       | 3       | 4       | 4       | 4       |
| 9              | 4                    | 4                      | 3       | 3       |         | 3                      | 3       | 3       | 5       | 5       | 5       |
| 10             | 5                    | 4                      | 3       | 2       |         | 2                      | 2       | 3       | 5       | 4       | 4       |
| 11             | 3                    | 3                      | 2       | 2       |         | 2                      | 2       | 3       | 3       | 5       | 5       |
| 12             | 4                    | 4                      | 3       | 3       |         | 3                      | 3       | 3       | 4       | 4       | 4       |
| 13             | 4                    | 4                      | 3       | 2       |         | 2                      | 2       | 2       | 3       | 4       | 4       |
| 14             | 4                    | 3                      | 3       | 3       |         | 3                      | 3       | 3       | 3       | 5       | 4       |
| 15             | 3                    | 3                      | 2       | 2       |         | 2                      | 2       | 2       | 3       | 4       | 4       |
| 16             | 4                    | 4                      | 3       | 3       |         | 3                      | 3       | 3       | 3       | 5       | 4       |
| 17             | 4                    | 4                      | 4       | 4       |         | 4                      | 4       | 4       | 4       | 5       | 4       |
| 18             | 5                    | 5                      | 2       | 2       |         | 2                      | 2       | 2       | 2       | 3       | 3       |
| 19             | 4                    | 4                      | 2       | 2       |         | 2                      | 2       | 2       | 3       | 4       | 4       |
| 20             | 4                    | 5                      | 1       | 1       |         | 1                      | 1       | 1       | 3       | 3       | 3       |
| 21             | 3                    | 4                      | 3       | 3       |         | 2                      | 3       | 4       | 4       | 4       | 2       |
| 22             | 4                    | 4                      | 2       | 2       |         | 3                      | 3       | 3       | 3       | 4       | 4       |
| 23             | 5                    | 3                      | 1       | 2       |         | 3                      | 2       | 2       | 3       | 5       | 4       |
| 24             | 4                    | 3                      | 2       | 3       |         | 2                      | 2       | 4       | 4       | 5       | 5       |
| 25             | 4                    | 4                      | 3       | 1       |         | 2                      | 3       | 2       | 3       | 4       | 4       |
| Range          | 3.0–6.0              | 2.0–6.0                | 0.0–4.0 | 0.0–4.0 | 2.0–2.0 | 0.0–4.0                | 0.0–5.0 | 1.0–5.0 | 2.0–5.0 | 2.0–5.0 | 2.0–5.0 |
| Mean           | 4.00                 | 3.76                   | 2.24    | 2.17    | 2.00    | 2.40                   | 2.48    | 2.84    | 3.52    | 4.00    | 3.80    |
| SD ( ± )       | 0.76                 | 0.83                   | 0.88    | 0.87    | 0.00    | 0.91                   | 1.00    | 0.94    | 0.82    | 0.87    | 0.76    |
| Median         | 4.00                 | 4.00                   | 2.00    | 2.00    | 2.00    | 2.00                   | 2.00    | 3.00    | 3.00    | 4.00    | 4.00    |
| <b>p</b>       |                      | 0.043*                 | <0.001* | <0.001* | -       | <0.001*                | <0.001* | 0.001*  | 0.059*  | 0.047*  | 0.030*  |

p:p value for Wilcoxon signed ranks test for comparing between Baseline and each other periods

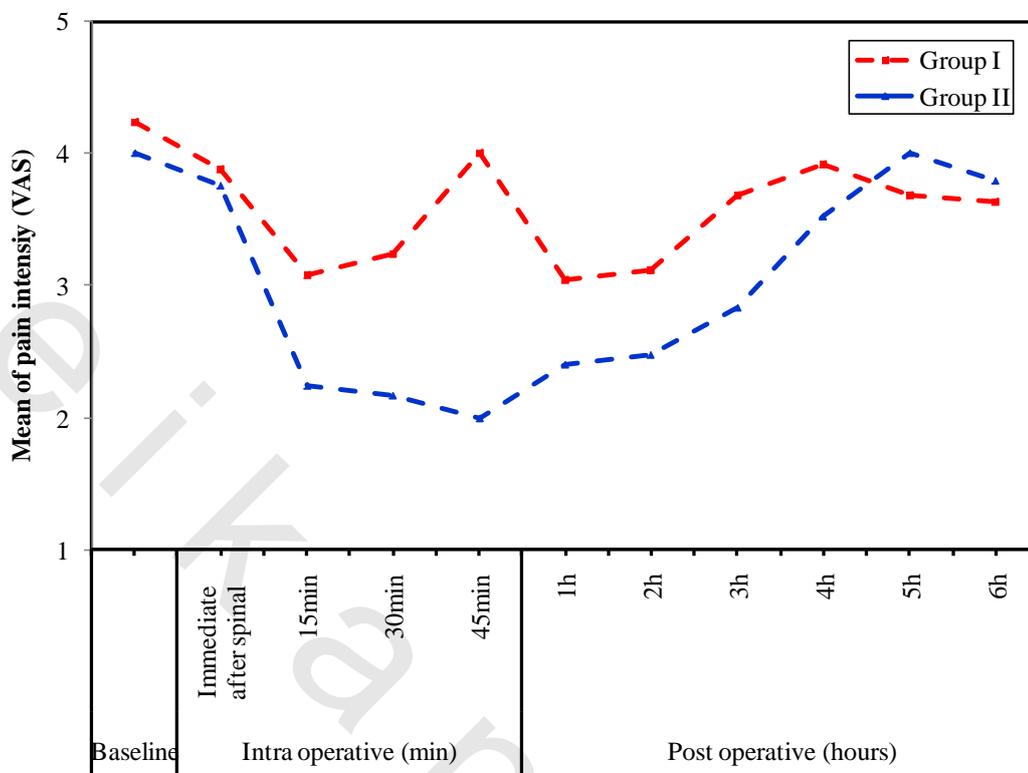
\*: Statistically significant at  $p \leq 0.05$

**Table XX Comparison between the two studied groups as regards the changes in pain intensity by Visual Analogue Scale (VAS).**

|                 | Pain intensity (VAS) |                        |         |         |         |                        |         |         |         |         |         |
|-----------------|----------------------|------------------------|---------|---------|---------|------------------------|---------|---------|---------|---------|---------|
|                 | Baseline             | Intra operative(min)   |         |         |         | Post operative (hours) |         |         |         |         |         |
|                 |                      | Immediate after spinal | 15min   | 30min   | 45min   | 1h                     | 2h      | 3h      | 4h      | 5h      | 6h      |
| <b>Group I</b>  |                      |                        |         |         |         |                        |         |         |         |         |         |
| Range           | 3.0–5.0              | 3.0- 5.0               | 1.0–4.0 | 3.0–4.0 |         | 2.0–4.0                | 2.0–4.0 | 3.0–6.0 | 3.0–5.0 | 3.0–5.0 | 3.0–5.0 |
| Mean            | 4.24                 | 3.88                   | 3.08    | 3.24    | 4.0     | 3.04                   | 3.12    | 3.68    | 3.92    | 3.68    | 3.64    |
| SD ( ± )        | 0.72                 | 0.78                   | 0.57    | 0.44    |         | 0.45                   | 0.53    | 0.80    | 0.49    | 0.63    | 0.64    |
|                 | 4.00                 | 4.00                   | 3.00    | 3.00    |         | 3.00                   | 3.00    | 4.00    | 4.00    | 4.00    | 4.00    |
| <b>Group II</b> |                      |                        |         |         |         |                        |         |         |         |         |         |
| Range           | 3.0–6.0              | 2.0–6.0                | 0.0–4.0 | 0.0–4.0 | 2.0–2.0 | 0.0–4.0                | 0.0–5.0 | 1.0–5.0 | 2.0–5.0 | 2.0–5.0 | 2.0–5.0 |
| Mean            | 4.00                 | 3.76                   | 2.24    | 2.17    | 2.00    | 2.40                   | 2.48    | 2.84    | 3.52    | 4.00    | 3.80    |
| SD ( ± )        | 0.76                 | 0.83                   | 0.88    | 0.87    | 0.00    | 0.91                   | 1.00    | 0.94    | 0.82    | 0.87    | 0.76    |
|                 | 4.00                 | 4.00                   | 2.00    | 2.00    | 2.00    | 2.00                   | 2.00    | 3.00    | 3.00    | 4.00    | 4.00    |
| <b>p</b>        | 0.187                | 0.594                  | 0.071   | 0.061   | -       | 0.002*                 | 0.002*  | 0.002*  | 0.035*  | 0.041*  | 0.024*  |

p: p value for Mann Whitney test for comparing between the two studied groups

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



**Figure (18): Comparison between the two studied groups as regard the changes in the pain intensity by mean Visual Analogue Scale (VAS).**

**First request for analgesia:** (tables XXI,XXII), (figures 19,20)

**Group I.**

First request of analgesia ranged between 165 to 255 min, with a mean of  $201.40 \pm 26.75$  min postoperatively.

18 parturient received 75 mg diclofenac sodium and one of them received 150 mg diclofenac and 25 mg pethidine.

**Group II.**

First request of analgesia ranged between 165 to 340 min, with a mean of  $260.20 \pm 44.90$  min.

12 parturient received 75 mg diclofenac sodium .

**Comparison between both groups.**

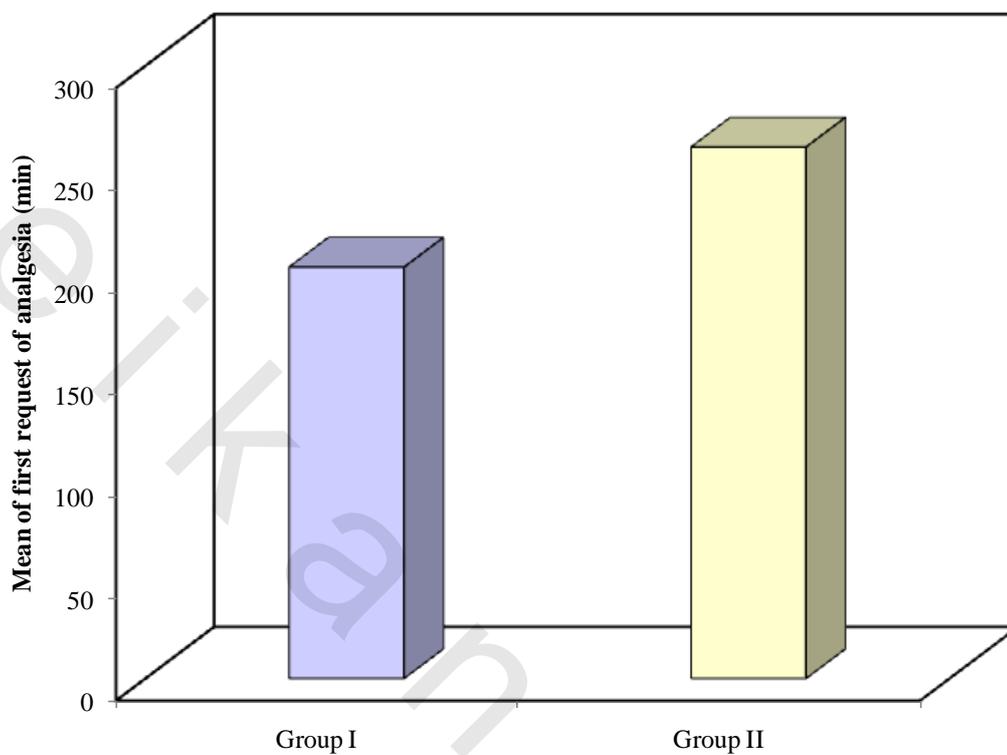
The readings showed a significant difference between both groups, with earlier request for analgesia in group I (P value  $< <0.001$ ), and more request for analgesia in group I.

**Table XXI: Comparison between the two studied groups as regard the time for first request of analgesia.**

| Parturient no. | Time for first request of analgesia (min) |               |
|----------------|---|---------------|
|                | Group I                                   | Group II      |
| 1              | 165                                       | 255           |
| 2              | 190                                       | 225           |
| 3              | 215                                       | 285           |
| 4              | 230                                       | 310           |
| 5              | 225                                       | 165           |
| 6              | 255                                       | 200           |
| 7              | 165                                       | 250           |
| 8              | 195                                       | 220           |
| 9              | 210                                       | 245           |
| 10             | 175                                       | 235           |
| 11             | 215                                       | 285           |
| 12             | 185                                       | 275           |
| 13             | 255                                       | 275           |
| 14             | 190                                       | 305           |
| 15             | 190                                       | 270           |
| 16             | 175                                       | 295           |
| 17             | 225                                       | 255           |
| 18             | 175                                       | 305           |
| 19             | 210                                       | 295           |
| 20             | 205                                       | 340           |
| 21             | 175                                       | 225           |
| 22             | 190                                       | 225           |
| 23             | 225                                       | 165           |
| 24             | 230                                       | 295           |
| 25             | 165                                       | 305           |
| Range          | 165.0 – 255.0                             | 165.0 – 340.0 |
| Mean           | 201.40                                    | 260.20        |
| SD ( ± )       | 26.75                                     | 44.90         |
| <b>p</b>       | <b>&lt;0.001*</b>                         |               |

p: p value for Student t-test for comparing between the two studied group

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



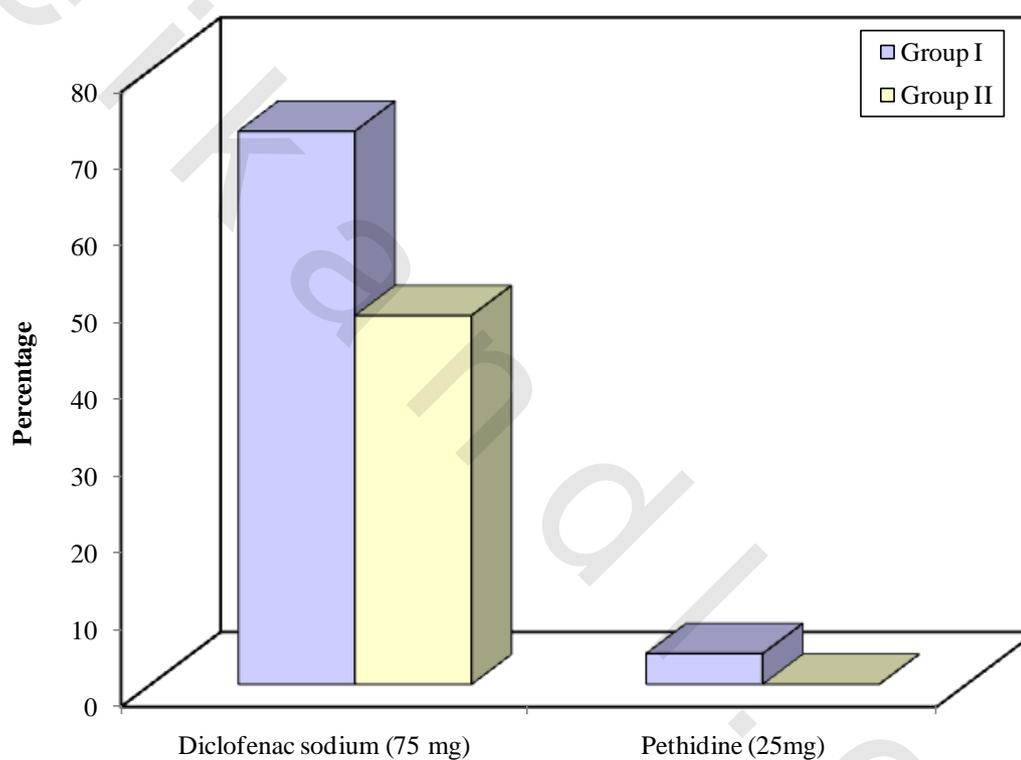
**Figure (19): Comparison between the two studied groups as regard the mean time for first request of analgesia (min).**

**Table XXII: Comparison between the two studied groups as regard the number and percentage of parturient received diclofenac sodium and pethidine for analgesia.**

|                                  | Group I (n = 25) |      | Group II (n = 25) |      | p                     |
|----------------------------------|------------------|------|-------------------|------|-----------------------|
|                                  | No.              | %    | No.               | %    |                       |
| <b>Diclofenac sodium (75 mg)</b> | 18               | 72.0 | 12                | 48.0 | $\chi^2$ p= 0.083     |
| <b>Pethidine (25mg)</b>          | 1                | 4.0  | 0                 | 0.0  | <sup>FE</sup> p=1.000 |

<sup>$\chi^2$</sup> p: p value for Chi square test for comparing between the two studied group

<sup>FE</sup>p: p value for Fisher Exact test for comparing between the two studied group



**Figure (20): Comparison between the two studied groups as regard the percentage of parturient received diclofenac sodium and pethidine required for analgesia (%).**

## **Assessment of motor function:**

**The time of onset of motor block (min):** (table XXIII), (figure 21)

### **Group I.**

The time of onset of motor block ranged between 3 and 6 min, with a mean of  $4.80 \pm 0.87$  min.

### **Group II.**

The time of onset of motor block ranged between 2 and 5 min, with a mean of  $3.80 \pm 0.91$  min.

### **Comparison between both groups.**

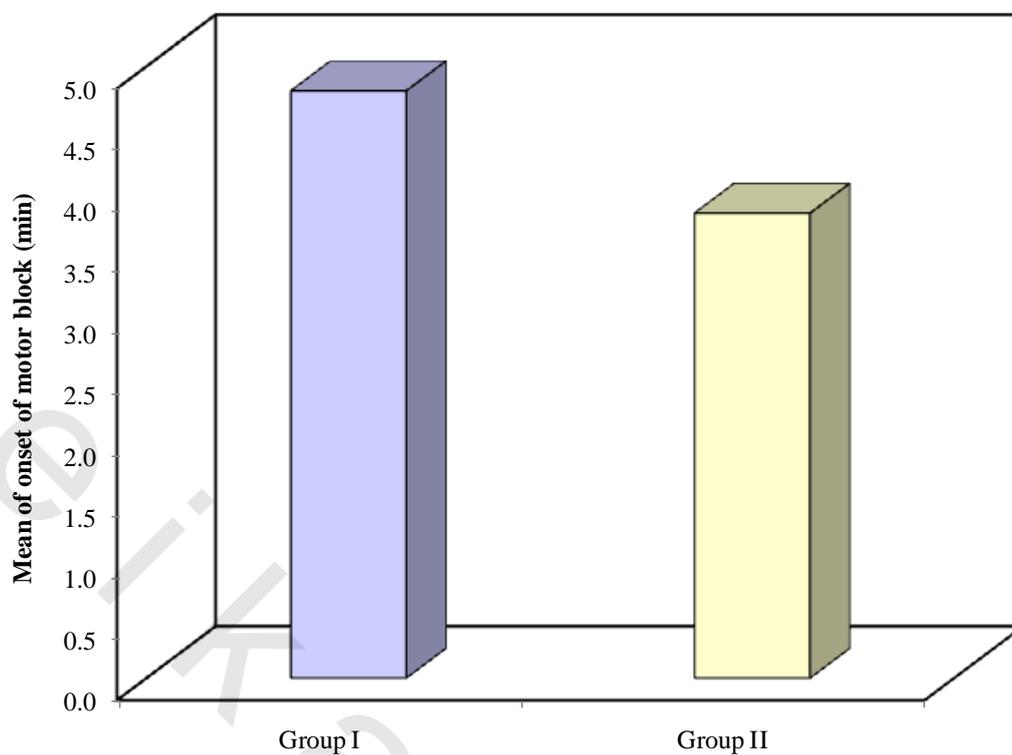
The readings showed a significant difference between both groups, with faster onset of motor block in Group II (P value < 0.001).

**Table XXIII: Comparison between the two studied groups as regards the time of onset of motor block (min).**

| Parturient no. | Time of onset of motor block (min) |           |
|----------------|------------------------------------|-----------|
|                | Group I                            | Group II  |
| 1              | 5                                  | 4         |
| 2              | 6                                  | 3         |
| 3              | 6                                  | 5         |
| 4              | 6                                  | 3         |
| 5              | 5                                  | 2         |
| 6              | 5                                  | 3         |
| 7              | 5                                  | 3         |
| 8              | 5                                  | 3         |
| 9              | 6                                  | 5         |
| 10             | 4                                  | 4         |
| 11             | 3                                  | 5         |
| 12             | 6                                  | 5         |
| 13             | 5                                  | 3         |
| 14             | 5                                  | 4         |
| 15             | 4                                  | 5         |
| 16             | 5                                  | 5         |
| 17             | 5                                  | 4         |
| 18             | 4                                  | 5         |
| 19             | 5                                  | 4         |
| 20             | 4                                  | 4         |
| 21             | 4                                  | 3         |
| 22             | 5                                  | 4         |
| 23             | 4                                  | 3         |
| 24             | 3                                  | 3         |
| 25             | 5                                  | 3         |
| Range          | 3.0 – 6.0                          | 2.0 – 5.0 |
| Mean           | 4.80                               | 3.80      |
| SD (±)         | 0.87                               | 0.91      |
| <b>p</b>       | <b>&lt;0.001*</b>                  |           |

p: p value for Student t-test for comparing between the two studied group

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



**Figure (21): Comparison between the two studied groups as regards the mean time of onset of motor block (min).**

**Block resolution using modified Bromage score (MBS):** (tables XXIV- XXVI), (figure 22)

**Group I.**

• **Intra-operative**

Immediately after spinal anaesthesia, MBS ranged between 1 and 2, with a mean of  $1.44 \pm 0.51$ .

At 15 min , MBS was 3, with a mean of  $3.0 \pm 0.0$ .

At 30 min , MBS was 3, with a mean of  $3.0 \pm 0.0$ .

At 45 min , MBS was 3.

• **Postoperative**

After 15 min , MBS was 3, with a mean of  $3.0 \pm 0.0$ .

After 30 min , it ranged between 2 and 3, with a mean of  $2.64 \pm 0.49$ .

After 45 min , it ranged between 2 and 3, with a mean of  $2.24 \pm 0.52$ .

After 60 min , it ranged between 1 and 3, with a mean of  $1.92 \pm 0.64$ .

After 75 min , it ranged between 0 and 3, with a mean of  $1.32 \pm 0.85$ .

After 90 min , it ranged between 0 and 2, with a mean of  $0.88 \pm 0.83$ .

After 105 min , it ranged between 0 and 2, with a mean of  $0.48 \pm 0.59$ .

After 120 min , it ranged between 0 and 1, with a mean of  $0.08 \pm 0.28$ .

After 135 min , MBS was 0 .

**Group II.**

• **Intra-operative**

Immediately after spinal , MBS ranged between 0 and 2, with a mean of  $1.40 \pm 0.60$ .

At 15 min , it was 3, with a mean of  $3.0 \pm 0.0$ .

At 30 min , it was 3, with a mean of  $3.0 \pm 0.0$ .

At 45 min , MBS was 3.

• **Postoperative**

After 15 min , MBS ranged between 2 and 3, with a mean of  $2.92 \pm 0.28$ .

After 30 min , it ranged between 1 and 3, with a mean of  $2.72 \pm 0.46$ .

After 45 min , it ranged between 1 and 3, with a mean of  $2.24 \pm 0.60$ .

After 60 min , it ranged between 0 and 3, with a mean of  $1.80\pm 0.71$ .

After 75 min , it ranged between 0 and 3, with a mean of  $1.44\pm 0.77$ .

After 90 min , it ranged between 0 and 2, with a mean of  $0.88\pm 0.78$ .

After 105 min , it ranged between 0 and 1, with a mean of  $0.40\pm 0.50$ .

After 120 min , MBS was 0.

After 135 min , MBS was 0.

**Comparison between both groups.**

The readings showed no significant difference as regard block resolution using modified Bromage score between both groups immediately after spinal (P value = 0.662), 15 min (P value = 1.000), 30 min (P value = 1.000) intraoperatively and post operative at 15 min (P value = 0.153), 30 min (P value = 0.548), 45 min (P value = 0.945), 60 min (P value = 0.498), 75 min (P value = 0.638) and 90 min (P value = 0.975), 105 min (P value = 0.693), 120 min (P value = 0.153) and 135 min (P value = 1.000).

Table XXIV: Changes in motor block resolution using modified Bromage score in Group I.

| Parturient no. | Modified Bromage score |         |         |     |                      |         |         |         |         |         |         |         |         |
|----------------|------------------------|---------|---------|-----|----------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                | Intra operative (min)  |         |         |     | Post operative (min) |         |         |         |         |         |         |         |         |
|                | Immediate after spinal | 15      | 30      | 45  | 15                   | 30      | 45      | 60      | 75      | 90      | 105     | 120     | 135     |
| 1              | 2                      | 3       | 3       |     | 3                    | 3       | 2       | 2       | 1       | 1       | 1       | 0       | 0       |
| 2              | 1                      | 3       | 3       |     | 3                    | 3       | 3       | 3       | 2       | 2       | 1       | 1       | 0       |
| 3              | 1                      | 3       |         |     | 3                    | 2       | 2       | 2       | 1       | 1       | 0       | 0       | 0       |
| 4              | 2                      | 3       | 3       |     | 3                    | 3       | 3       | 2       | 2       | 1       | 1       | 0       | 0       |
| 5              | 1                      | 3       |         |     | 3                    | 3       | 2       | 2       | 1       | 1       | 0       | 0       | 0       |
| 6              | 2                      | 3       | 3       |     | 3                    | 3       | 2       | 2       | 1       | 0       | 0       | 0       | 0       |
| 7              | 1                      | 3       | 3       |     | 3                    | 3       | 3       | 3       | 2       | 2       | 1       | 1       | 0       |
| 8              | 2                      | 3       | 3       |     | 3                    | 3       | 2       | 2       | 2       | 1       | 1       | 0       | 0       |
| 9              | 1                      | 3       | 3       |     | 3                    | 2       | 2       | 2       | 1       | 0       | 0       | 0       | 0       |
| 10             | 1                      | 3       | 3       |     | 3                    | 2       | 2       | 1       | 0       | 0       | 0       | 0       | 0       |
| 11             | 2                      | 3       | 3       |     | 3                    | 3       | 3       | 2       | 2       | 1       | 1       | 0       | 0       |
| 12             | 1                      | 3       | 3       |     | 3                    | 3       | 2       | 2       | 2       | 2       | 1       | 0       | 0       |
| 13             | 2                      | 3       | 3       | 3   | 3                    | 3       | 3       | 3       | 2       | 2       | 1       | 0       | 0       |
| 14             | 1                      | 3       | 3       |     | 3                    | 3       | 3       | 2       | 2       | 2       | 1       | 0       | 0       |
| 15             | 2                      | 3       |         |     | 3                    | 3       | 2       | 2       | 1       | 0       | 0       | 0       | 0       |
| 16             | 1                      | 3       |         |     | 3                    | 3       | 2       | 2       | 2       | 1       | 0       | 0       | 0       |
| 17             | 1                      | 3       | 3       |     | 3                    | 3       | 3       | 3       | 3       | 2       | 2       | 0       | 0       |
| 18             | 1                      | 3       | 3       |     | 3                    | 2       | 2       | 1       | 1       | 0       | 0       | 0       | 0       |
| 19             | 2                      | 3       | 3       |     | 3                    | 3       | 2       | 2       | 2       | 2       | 1       | 0       | 0       |
| 20             | 1                      | 3       | 3       |     | 3                    | 2       | 2       | 2       | 2       | 1       | 0       | 0       | 0       |
| 21             | 1                      | 3       | 3       |     | 3                    | 2       | 2       | 1       | 0       | 0       | 0       | 0       | 0       |
| 22             | 2                      | 3       | 3       |     | 3                    | 3       | 2       | 1       | 0       | 0       | 0       | 0       | 0       |
| 23             | 1                      | 3       | 3       |     | 3                    | 2       | 2       | 2       | 1       | 0       | 0       | 0       | 0       |
| 24             | 2                      | 3       | 3       |     | 3                    | 2       | 1       | 1       | 0       | 0       | 0       | 0       | 0       |
| 25             | 2                      | 3       | 3       |     | 3                    | 2       | 2       | 1       | 0       | 0       | 0       | 0       | 0       |
| Range          | 1.0-2.0                | 3.0-3.0 | 3.0-3.0 |     | 3.0-3.0              | 2.0-3.0 | 1.0-3.0 | 1.0-3.0 | 0.0-3.0 | 0.0-2.0 | 0.0-2.0 | 0.0-1.0 | 0.0-0.0 |
| Mean           | 1.44                   | 3.0     | 3.0     | 3.0 | 3.0                  | 2.64    | 2.24    | 1.92    | 1.32    | 0.88    | 0.48    | 0.08    | 0.0     |
| SD (±)         | 0.51                   | 0.0     | 0       | 3.0 | 0                    | 0.49    | 0.52    | 0.64    | 0.85    | 0.83    | 0.59    | 0.28    | 0.0     |
| Median         | 1.00                   | 3.00    | 3.00    |     | 3.00                 | 3.00    | 2.00    | 2.00    | 1.00    | 1.00    | 0.00    | 0.00    | 0.00    |
| p              |                        | <0.001* | <0.001* | -   | <0.001*              | <0.001* | <0.001* | 0.014*  | 0.025*  | 0.015*  | <0.001* | <0.001* | <0.001* |

p:p value for Wilcoxon signed ranks test for comparing between Baseline and each other periods

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

Table XXV Changes in block resolution using modified Bromage score in Group II.

| Parturient no. | Modified Bromage score |         |         |         |                      |         |         |         |         |         |         |         |         |
|----------------|------------------------|---------|---------|---------|----------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                | Intra operative (min)  |         |         |         | Post operative (min) |         |         |         |         |         |         |         |         |
|                | Immediate after spinal | 15      | 30      | 45      | 15                   | 30      | 45      | 60      | 75      | 90      | 105     | 120     | 135     |
| 1              | 1                      | 3       | 3       | 3       | 3                    | 3       | 2       | 2       | 1       | 0       | 0       | 0       | 0       |
| 2              | 1                      | 3       | 3       |         | 3                    | 2       | 1       | 1       | 0       | 0       | 0       | 0       | 0       |
| 3              | 2                      | 3       | 3       |         | 3                    | 3       | 3       | 3       | 2       | 2       | 1       | 0       | 0       |
| 4              | 2                      | 3       | 3       |         | 3                    | 3       | 3       | 3       | 2       | 2       | 1       | 0       | 0       |
| 5              | 1                      | 3       | 3       |         | 3                    | 3       | 2       | 1       | 0       | 0       | 0       | 0       | 0       |
| 6              | 1                      | 3       |         |         | 3                    | 3       | 2       | 2       | 2       | 1       | 1       | 0       | 0       |
| 7              | 0                      | 3       | 3       |         | 3                    | 3       | 2       | 2       | 2       | 0       | 0       | 0       | 0       |
| 8              | 2                      | 3       | 3       | 3       | 3                    | 3       | 2       | 2       | 2       | 1       | 0       | 0       | 0       |
| 9              | 2                      | 3       | 3       |         | 3                    | 2       | 1       | 1       | 1       | 1       | 1       | 0       | 0       |
| 10             | 1                      | 3       | 3       |         | 3                    | 2       | 2       | 1       | 1       | 1       | 1       | 0       | 0       |
| 11             | 1                      | 3       | 3       |         | 3                    | 2       | 2       | 1       | 1       | 1       | 0       | 0       | 0       |
| 12             | 2                      | 3       | 3       |         | 2                    | 2       | 2       | 1       | 1       | 0       | 0       | 0       | 0       |
| 13             | 1                      | 3       | 3       |         | 3                    | 2       | 2       | 2       | 2       | 2       | 1       | 0       | 0       |
| 14             | 1                      | 3       | 3       |         | 3                    | 3       | 2       | 1       | 1       | 1       | 0       | 0       | 0       |
| 15             | 1                      | 3       | 3       |         | 3                    | 3       | 2       | 2       | 2       | 2       | 0       | 0       | 0       |
| 16             | 1                      | 3       | 3       |         | 3                    | 3       | 3       | 3       | 3       | 2       | 0       | 0       | 0       |
| 17             | 2                      | 3       | 3       |         | 3                    | 3       | 3       | 1       | 0       | 0       | 0       | 0       | 0       |
| 18             | 1                      | 3       | 3       |         | 3                    | 3       | 3       | 3       | 2       | 0       | 0       | 0       | 0       |
| 19             | 2                      | 3       | 3       |         | 2                    | 2       | 2       | 1       | 1       | 0       | 0       | 0       | 0       |
| 20             | 2                      | 3       | 3       |         | 3                    | 3       | 2       | 2       | 1       | 0       | 0       | 0       | 0       |
| 21             | 1                      | 3       | 3       |         | 3                    | 3       | 3       | 2       | 2       | 1       | 1       | 0       | 0       |
| 22             | 2                      | 3       | 3       |         | 3                    | 3       | 2       | 2       | 2       | 2       | 1       | 0       | 0       |
| 23             | 1                      | 3       | 3       |         | 3                    | 3       | 3       | 2       | 2       | 1       | 1       | 0       | 0       |
| 24             | 2                      | 3       | 3       |         | 3                    | 3       | 2       | 2       | 2       | 1       | 0       | 0       | 0       |
| 25             | 1                      | 3       | 3       |         | 3                    | 3       | 3       | 2       | 1       | 1       | 1       | 0       | 0       |
| Range          | 00-2.0                 | 3.0-3.0 | 3.0-3.0 | 3.0-3.0 | 2.0-3.0              | 2.0-3.0 | 1.0-3.0 | 1.0-3.0 | 0.0-3.0 | 0.0-2.0 | 0.0-1.0 | 0.0-0.0 | 0.0-0.0 |
| Mean           | 1.4                    | 3.0     | 3.0     | 3.0     | 2.92                 | 2.72    | 2.24    | 1.80    | 1.44    | 0.88    | 0.40    | 0.0     | 0.0     |
| SD (±)         | 0.6                    | 0.0     | 0.0     | 0.0     | 0.28                 | 0.46    | 0.60    | 0.71    | 0.77    | 0.78    | 0.50    | 0.0     | 0.0     |
| Median         | 1.00                   | 3.00    | 3.00    | 3.00    | 3.00                 | 3.00    | 2.00    | 2.00    | 2.00    | 1.00    | 0.00    | 0.00    | 0.00    |
| p              |                        | <0.001* | <0.001* | -       | <0.001*              | <0.001* | <0.001* | 0.027*  | 0.014*  | 0.018*  | <0.001* | <0.001* | <0.001* |

p:p value for Wilcoxon signed ranks test for comparing between Baseline and each other periods

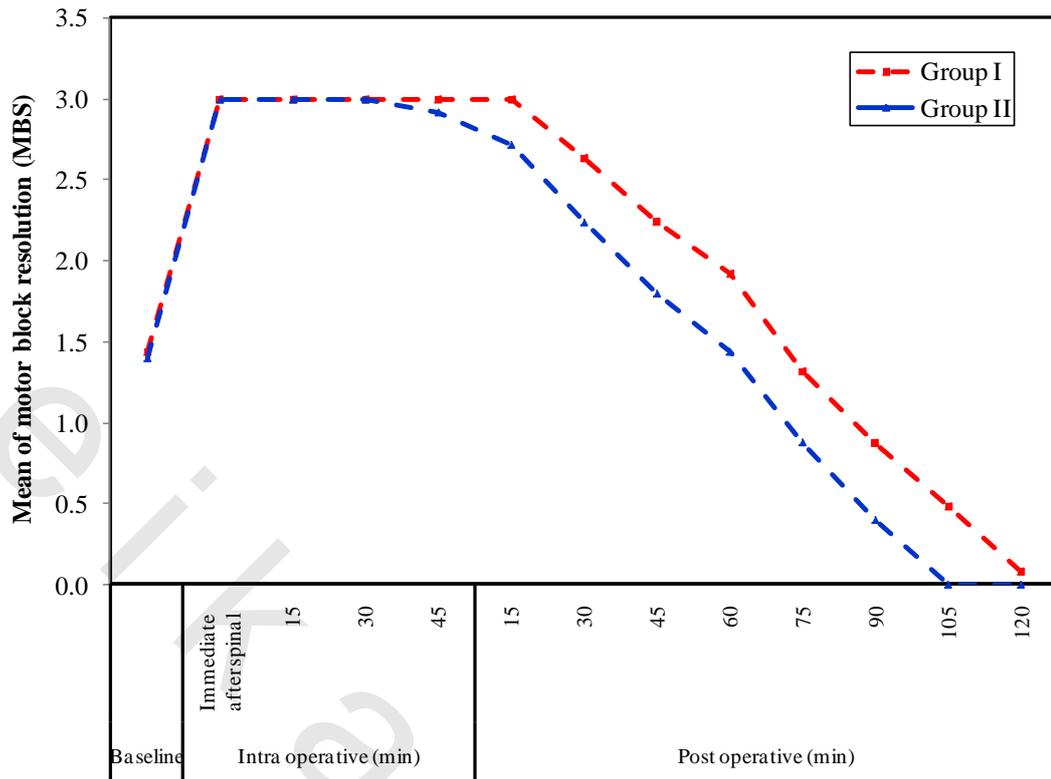
\*: Statistically significant at  $p \leq 0.05$

**Table XXVI: Comparison between the two studied groups as regard the changes in motor block resolution using modified Bromage score.**

|                 | Modified Bromage score |         |         |         |                      |         |          |         |         |         |         |          |         |
|-----------------|------------------------|---------|---------|---------|----------------------|---------|----------|---------|---------|---------|---------|----------|---------|
|                 | Intra operative (min)  |         |         |         | Post operative (min) |         |          |         |         |         |         |          |         |
|                 | Immediate after spinal | 15      | 30      | 45      | 15                   | 30      | 45       | 60      | 75      | 90      | 105     | 120      | 135     |
| <b>Group I</b>  |                        |         |         |         |                      |         |          |         |         |         |         |          |         |
| Range           | 1.0–2.0                | 3.0–3.0 | 3.0–3.0 |         | 3.0–3.0              | 2.0–3.0 | 1.0- 3.0 | 1.0–3.0 | 0.0–3.0 | 0.0–2.0 | 0.0–2.0 | 0.0 -1.0 | 0.0–0.0 |
| Mean            | 1.44                   | 3.0     | 3.0     | 3.0     | 3.0                  | 2.64    | 2.24     | 1.92    | 1.32    | 0.88    | 0.48    | 0.08     | 0.0     |
| SD ( ± )        | 0.51                   | 0.0     | 0       |         | 0                    | 0.49    | 0.52     | 0.64    | 0.85    | 0.83    | 0.59    | 0.28     | 0.0     |
| Median          | 1.00                   | 3.00    | 3.00    |         | 3.00                 | 3.00    | 2.00     | 2.00    | 1.00    | 1.00    | 0.00    | 0.00     | 0.00    |
| <b>Group II</b> |                        |         |         |         |                      |         |          |         |         |         |         |          |         |
| Range           | 0.0–2.0                | 3.0–3.0 | 3.0–3.0 | 3.0–3.0 | 2.0–3.0              | 2.0–3.0 | 1.0-3.0  | 1.0–3.0 | 0.0–3.0 | 0.0–2.0 | 0.0–1.0 | 0.0–0.0  | 0.0–0.0 |
| Mean            | 1.4                    | 3.0     | 3.0     | 3.0     | 2.92                 | 2.72    | 2.24     | 1.80    | 1.44    | 0.88    | 0.40    | 0.0      | 0.0     |
| SD ( ± )        | 0.6                    | 0.0     | 0.0     | 0.0     | 0.28                 | 0.46    | 0.60     | 0.71    | 0.77    | 0.78    | 0.50    | 0.0      | 0.0     |
| Median          | 1.00                   | 3.00    | 3.00    | 3.00    | 3.00                 | 3.00    | 2.00     | 2.00    | 2.00    | 1.00    | 0.00    | 0.00     | 0.00    |
| <b>p</b>        | 0.662                  | 1.000   | 1.000   | -       | 0.153                | 0.548   | 0.945    | 0.498   | 0.638   | 0.975   | 0.693   | 0.153    | 1.000   |

p: p value for Mann Whitney test for comparing between the two studied groups

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



**Figure (22): Comparison between the two studied groups as regard the changes in mean motor block resolution using modified Bromage score (MBS). Duration of motor block (min)**

**Duration of motor block (min):** (table XXVII), (figure 23)

**Group I.**

Duration of motor block ranged between 73 and 120 min with a mean of  $88.80 \pm 19.81$  min.

**Group II.**

Duration of motor block ranged between 73 and 118 min with a mean of  $88.20 \pm 16.95$  min.

**Comparison between both groups.**

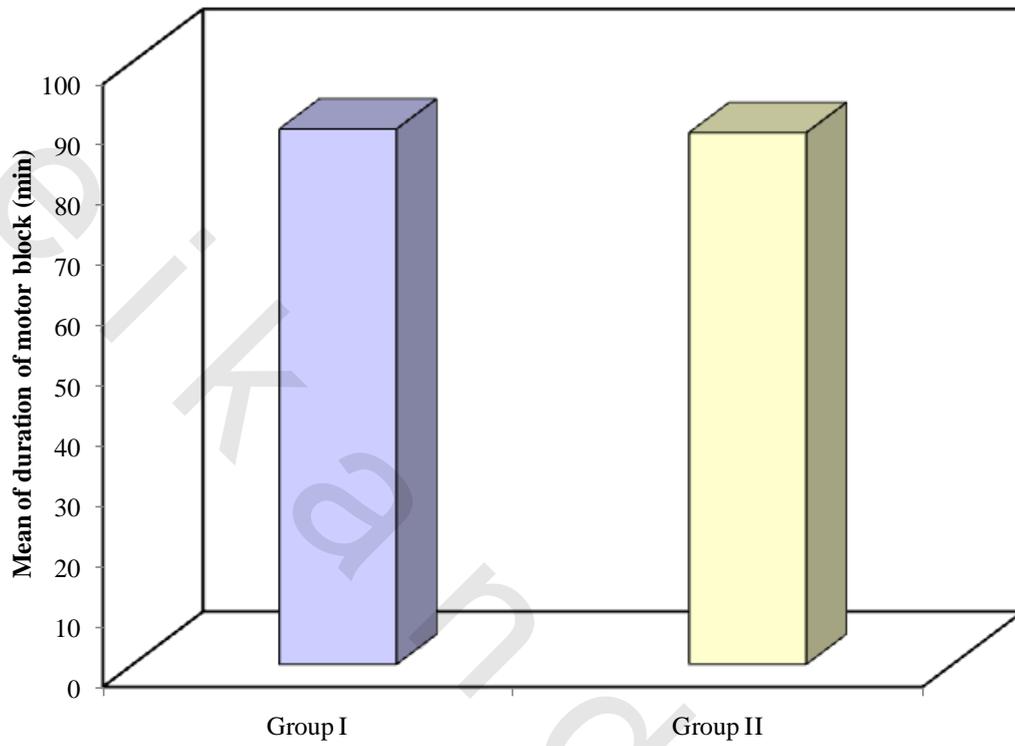
The readings showed no significant difference between both groups, with (P value = 0.909).

**Table XXVII: Comparison between the two studied groups as regard the duration of motor block (min).**

| Parturient no. | Duration of motor block (min) |              |
|----------------|-------------------------------|--------------|
|                | Group I                       | Group II     |
| 1              | 105                           | 75           |
| 2              | 120                           | 60           |
| 3              | 90                            | 105          |
| 4              | 105                           | 105          |
| 5              | 90                            | 60           |
| 6              | 75                            | 105          |
| 7              | 120                           | 60           |
| 8              | 105                           | 90           |
| 9              | 75                            | 105          |
| 10             | 60                            | 105          |
| 11             | 105                           | 90           |
| 12             | 105                           | 75           |
| 13             | 105                           | 105          |
| 14             | 105                           | 90           |
| 15             | 75                            | 90           |
| 16             | 90                            | 90           |
| 17             | 105                           | 60           |
| 18             | 75                            | 75           |
| 19             | 105                           | 75           |
| 20             | 90                            | 75           |
| 21             | 60                            | 105          |
| 22             | 60                            | 105          |
| 23             | 75                            | 105          |
| 24             | 60                            | 90           |
| 25             | 60                            | 105          |
| Range          | 60.0 – 120.0                  | 60.0 – 105.0 |
| Mean           | 88.80                         | 88.20        |
| SD (±)         | 19.81                         | 16.95        |
| <b>p</b>       | 0.909                         |              |

p: p value for Student t-test for comparing between the two studied group

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



**Figure (23): Comparison between the two studied groups as regard the duration of motor block (min).**

**Side effects:** (table XXVIII), (figure 24)

**Group I.**

No side effects occurred in 28%, itching in 20%, nausea and vomiting in 24%, and hypotension in 12%.

**Group II.**

No side effects occurred in 36%, Sedation measured by Ramsay Sedation Score in 20% (RSS 3-4), nausea and vomiting in 4%, hypotension in 16%, bradycardia in 8% and shivering in 8% of parturient.

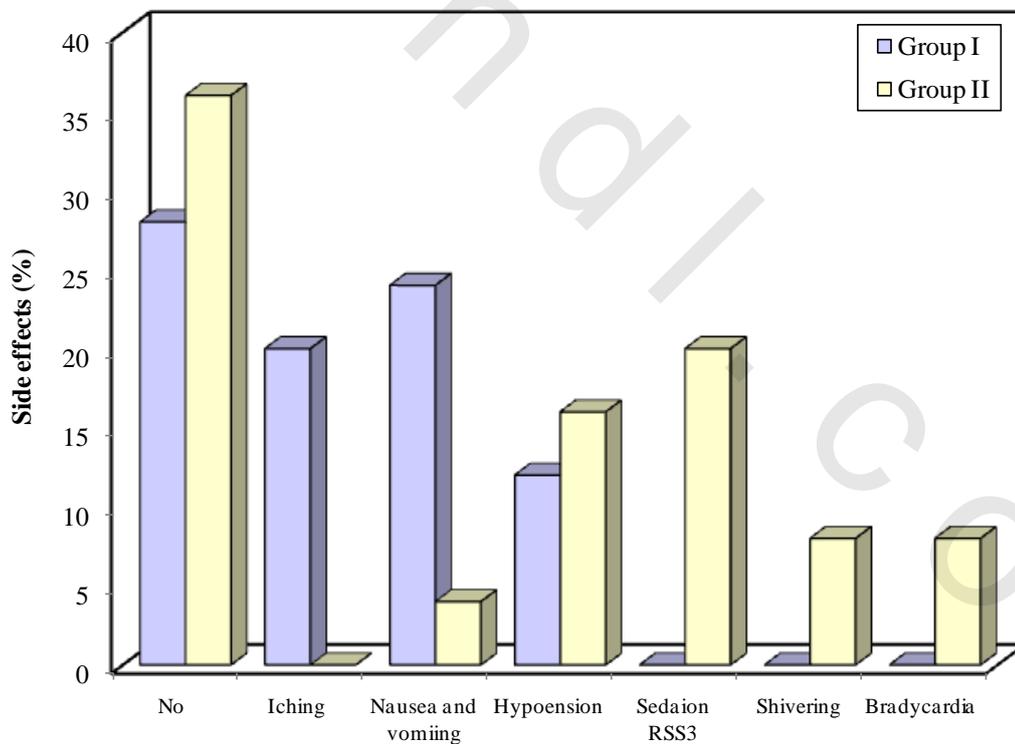
**Comparison between both groups.**

The readings showed no significant difference between both groups except more sedation in Group II (P value = 0.050) and itching in Group I (P value = 0.050).

**Table XXVIII: Comparison between the two studied groups as regards the side effects.**

|                     | Group I<br>(n = 25) |      | Group II<br>(n = 25) |      | p                       |
|---------------------|---------------------|------|----------------------|------|-------------------------|
|                     | No.                 | %    | No.                  | %    |                         |
| <b>Side effects</b> |                     |      |                      |      |                         |
| No                  | 7                   | 28.0 | 9                    | 36.0 | $\chi^2$ p=0.544        |
| Itching             | 5                   | 20.0 | 0                    | 0.0  | <sup>FE</sup> p= 0.050* |
| Nausea and vomiiing | 6                   | 24.0 | 1                    | 4.0  | <sup>FE</sup> p= 0.098  |
| Hypotension         | 3                   | 12.0 | 4                    | 16.0 | <sup>FE</sup> p= 1.000  |
| Sedation RSS        | 0                   | 0.0  | 5                    | 20.0 | <sup>FE</sup> p= 0.050* |
| Shivering           | 0                   | 0.0  | 2                    | 8.0  | <sup>FE</sup> p= 0.490  |
| Bradycardia         | 0                   | 0.0  | 2                    | 8.0  | <sup>FE</sup> p= 0.490  |

$\chi^2$ : p value for Chi square test  
<sup>FE</sup>p: p value for Fisher Exact test  
 \*: Statistically significant at  $p \leq 0.05$



**Figure (24): Comparison between the two studied groups as regard the percentage of the side effects.**

**Assessment of fetal well-being:** (tables XXIX- XXXI), (figure 25)

**Group I.**

At 1 min: Apgar score ranged between 8 and 10 with a mean of  $9.48 \pm 0.65$ .

At 5 min: Apgar score ranged between 9 and 10 with a mean of  $9.84 \pm 0.37$ .

**Group II.**

At 1 min: Apgar score ranged between 8 and 10 with a mean of  $9.44 \pm 0.77$ .

At 5 min: Apgar score ranged between 9 and 10 with a mean of  $9.64 \pm 0.49$ .

**Comparison between the two studied groups**

There was no statistically significant difference between both groups as regard the Apgar score at 1 min ( $p = 0.991$ ) and 5 min ( $p = 0.111$ ).

**Table XXIX: Changes in Apgar score in Group I.**

| Parturient no. | Apgar score   |            |
|----------------|---------------|------------|
|                | 1 min         | 5 min      |
| 1              | 9             | 9          |
| 2              | 9             | 10         |
| 3              | 10            | 10         |
| 4              | 8             | 10         |
| 5              | 10            | 10         |
| 6              | 10            | 10         |
| 7              | 10            | 10         |
| 8              | 9             | 10         |
| 9              | 10            | 10         |
| 10             | 10            | 10         |
| 11             | 10            | 10         |
| 12             | 8             | 10         |
| 13             | 10            | 10         |
| 14             | 10            | 10         |
| 15             | 10            | 10         |
| 16             | 10            | 10         |
| 17             | 10            | 10         |
| 18             | 10            | 10         |
| 19             | 10            | 10         |
| 20             | 9             | 9          |
| 21             | 9             | 10         |
| 22             | 9             | 9          |
| 23             | 9             | 10         |
| 24             | 9             | 10         |
| 25             | 9             | 9          |
| Range          | 8.0 – 10.0    | 9.0 – 10.0 |
| Mean           | 9.48          | 9.84       |
| SD ( ± )       | 0.65          | 0.37       |
| Median         | 10.0          | 10.0       |
| <b>p</b>       | <b>0.014*</b> |            |

p: p value for Wilcoxon signed ranks test for comparing between Apgar score after 1 min with 5 min

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

**Table XXX: Changes in Apgar score in Group II.**

| Parturient no. | Apgar score |            |
|----------------|-------------|------------|
|                | 1 min       | 5 min      |
| 1              | 10          | 10         |
| 2              | 10          | 10         |
| 3              | 10          | 10         |
| 4              | 10          | 10         |
| 5              | 10          | 10         |
| 6              | 9           | 9          |
| 7              | 8           | 9          |
| 8              | 8           | 9          |
| 9              | 10          | 10         |
| 10             | 8           | 9          |
| 11             | 9           | 9          |
| 12             | 10          | 10         |
| 13             | 10          | 10         |
| 14             | 10          | 10         |
| 15             | 10          | 10         |
| 16             | 9           | 9          |
| 17             | 10          | 10         |
| 18             | 9           | 9          |
| 19             | 10          | 10         |
| 20             | 10          | 10         |
| 21             | 9           | 10         |
| 22             | 10          | 10         |
| 23             | 9           | 9          |
| 24             | 10          | 10         |
| 25             | 8           | 9          |
| Range          | 8.0 – 10.0  | 9.0 – 10.0 |
| Mean           | 9.44        | 9.64       |
| SD ( ± )       | 0.77        | 0.49       |
| Median         | 10.0        | 10.0       |
| <b>p</b>       | 0.025*      |            |

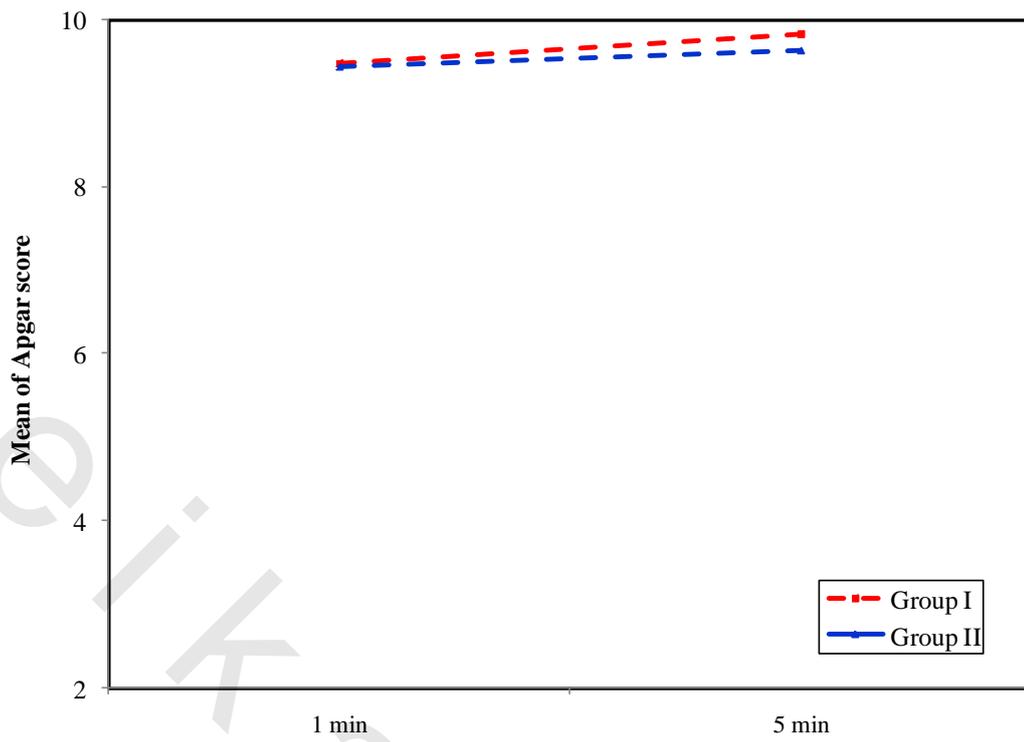
p: p value for Wilcoxon signed ranks test for comparing between Apgar score after 1 min with 5 min

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

**Table XXXI: Comparison between the two studied groups as regard Apgar score.**

|                 | Apgar score |            |
|-----------------|-------------|------------|
|                 | 1 min       | 5 min      |
| <b>Group I</b>  |             |            |
| Range           | 8.0 – 10.0  | 9.0 – 10.0 |
| Mean            | 9.48        | 9.84       |
| SD ( ± )        | 0.65        | 0.37       |
| Median          | 10.0        | 10.0       |
| <b>Group II</b> |             |            |
| Range           | 8.0 – 10.0  | 9.0 – 10.0 |
| Mean            | 9.44        | 9.64       |
| SD ( ± )        | 0.77        | 0.49       |
| Median          | 10.0        | 10.0       |
| <b>p</b>        | 0.991       | 0.111      |

p: p value for Mann Whitney test for comparing between the two studied groups



**Figure (25): Comparison between the two studied groups as regard Apgar score.**

**Measurement of satisfaction score by the parturient and surgeon:** (tables XXXII,XXXIII), (figures 26,27)

**Group I.**

Parturient satisfaction: ranged between 50 and 100 with a mean of  $80 \pm 14.43$ .

Surgeons' satisfaction: ranged between 75 and 100 with a mean of  $87.00 \pm 12.75$ .

**Group II.**

Parturient satisfaction: ranged between 75 and 100 with a mean of  $91.25 \pm 12.25$ .

Surgeons' satisfaction: ranged between 75 and 100 with a mean of  $87.00 \pm 12.75$ .

**Comparison between both groups.**

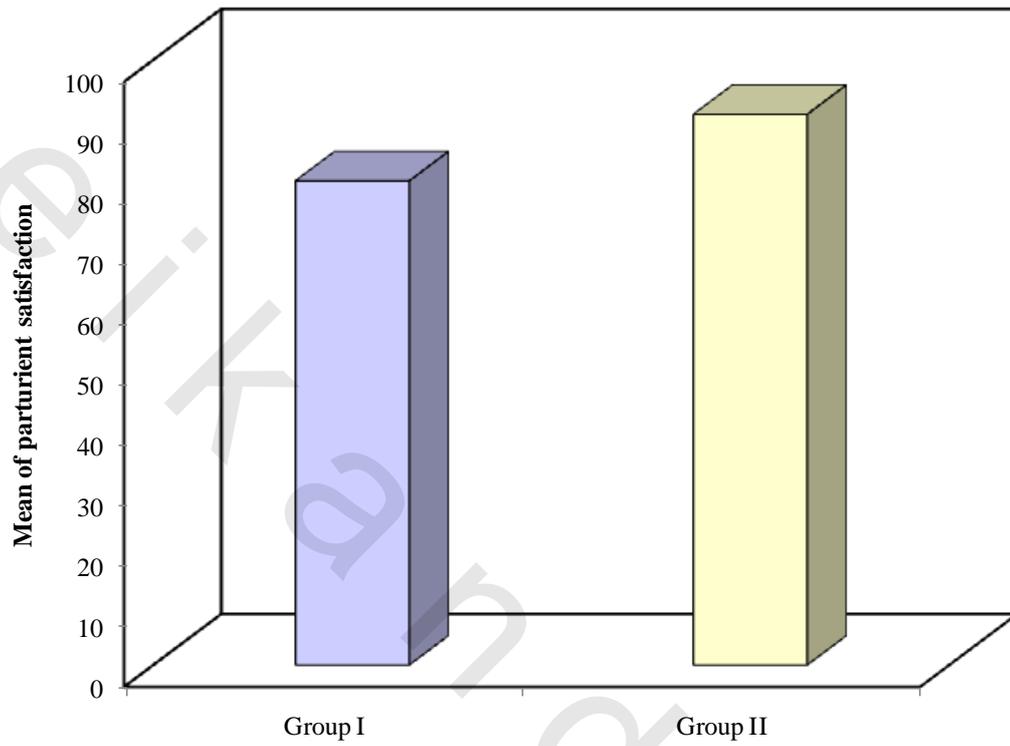
The readings showed more satisfaction by parturient in Group II(P value = 0.008) but no significant difference between both groups as regard the surgeons' satisfaction (P value = 1.000).

**Table XXXII: Comparison between the two studied groups as regard the parturient satisfaction.**

| Parturient no. | Satisfaction score |              |
|----------------|--------------------|--------------|
|                | Group I            | Group II     |
| 1              | 75                 | 100          |
| 2              | 75                 | 75           |
| 3              | 50                 | 75           |
| 4              | 75                 | 100          |
| 5              | 75                 | 100          |
| 6              | 75                 | 75           |
| 7              | 75                 | 75           |
| 8              | 75                 | 100          |
| 9              | 100                | 100          |
| 10             | 100                | 75           |
| 11             | 75                 | 100          |
| 12             | 75                 | 100          |
| 13             | 50                 | 100          |
| 14             | 100                | 100          |
| 15             | 100                | 100          |
| 16             | 75                 | 75           |
| 17             | 100                | 100          |
| 18             | 75                 | 100          |
| 19             | 100                | 100          |
| 20             | 75                 | 75           |
| 21             | 75                 | 75           |
| 22             | 75                 | 100          |
| 23             | 100                | 100          |
| 24             | 75                 | 100          |
| 25             | 75                 | 75           |
| Range          | 50.0 – 100.0       | 75.0 – 100.0 |
| Mean           | 80.0               | 91.0         |
| SD ( ± )       | 14.43              | 12.25        |
| Median         | 75.0               | 100.0        |
| <b>p</b>       | 0.008*             |              |

p: p value for Mann Whitney test for comparing between the two studied groups

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

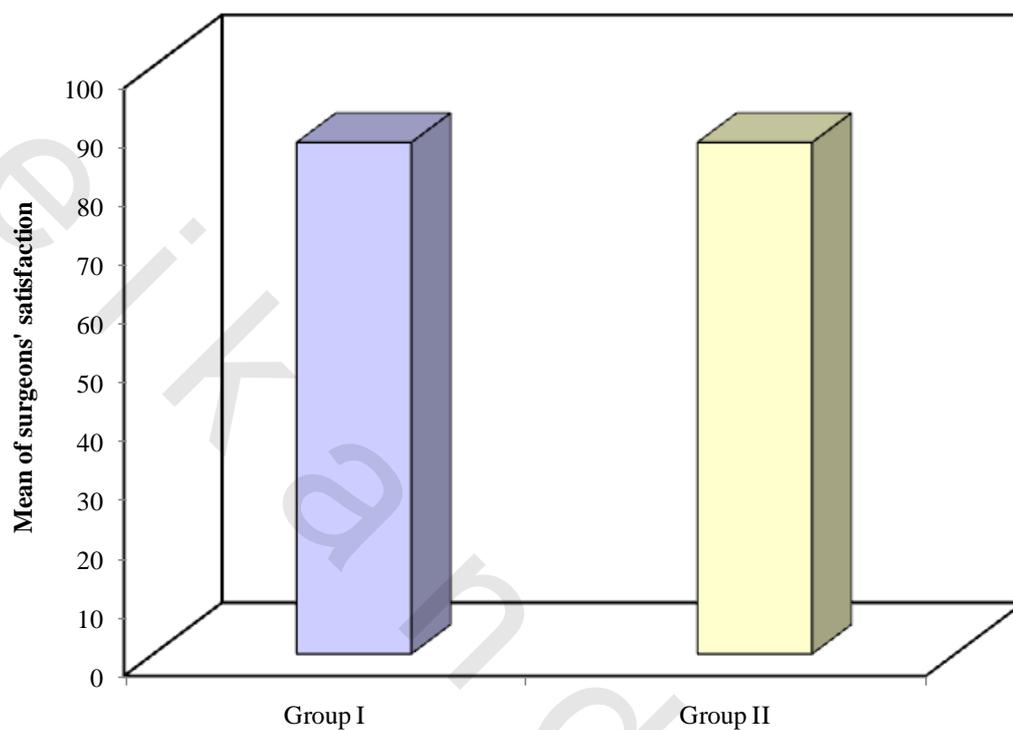


**Figure (26): Comparison between the two studied groups as regard the mean of the parturient satisfaction.**

**Table XXXIII: Comparison between the two studied groups as regard the surgeons' satisfaction.**

| Patient no. | Satisfaction score |              |
|-------------|--------------------|--------------|
|             | Group I            | Group II     |
| 1           | 75                 | 100          |
| 2           | 75                 | 75           |
| 3           | 75                 | 75           |
| 4           | 100                | 100          |
| 5           | 100                | 100          |
| 6           | 75                 | 75           |
| 7           | 75                 | 75           |
| 8           | 75                 | 100          |
| 9           | 100                | 100          |
| 10          | 100                | 75           |
| 11          | 75                 | 75           |
| 12          | 100                | 100          |
| 13          | 100                | 100          |
| 14          | 100                | 100          |
| 15          | 100                | 75           |
| 16          | 75                 | 75           |
| 17          | 100                | 100          |
| 18          | 75                 | 75           |
| 19          | 75                 | 100          |
| 20          | 75                 | 75           |
| 21          | 100                | 75           |
| 22          | 75                 | 100          |
| 23          | 100                | 75           |
| 24          | 75                 | 100          |
| 25          | 100                | 75           |
| Range       | 75.0 – 100.0       | 75.0 – 100.0 |
| Mean        | 87.0               | 87.0         |
| SD ( ± )    | 12.75              | 12.75        |
| <b>p</b>    | <b>1.000</b>       |              |

p: p value for Mann Whitney test for comparing between the two studied groups



**Figure (27): Comparison between the two studied groups as regard the mean of the surgeons' satisfaction.**