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Comparative study between the effects of either dexmedetomidine or clonidine when combined with bupivacaine in thoracic epidural anaesthesia in patient undergoing thoracotomy

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ABSTRACT

Pain following thoracic surgery has been reported to be among the most intense clinical experiences. Patients experience painful wound incisions that alter chest wall mechanics and ineffective chest expansion may predispose to atelectasis, ventilation/ perfusion mismatching, hypoxemia and infection. The aim of this study is to compare the preemptive use of either dexmedetomidine or clonidine when combined with bupivacaine versus bupivacaine alone in thoracic epidural anaesthesia in patient undergoing thoracotomy. Result: Although dexmedetomidine decrease heart rate and blood pressure but also it gives better analgesia and sedation for longer duration postoperative. The decrease in heart rate and blood pressure not serious and easily reversed by atropine and ephedrine. We concluded that Dexmedetomidine gives better analgesia and sedation for longer duration postoperative when used as adjuvant to bupivacaine in thoracic surgeries compared with clonidine which produce less analgesia and sedation and more haemodynamic instability.

Introduction

Pain following thoracic surgery has been reported to be among the most intense clinical experiences (1-2). The role of well-planned pain management has been crucial in decreasing morbidity after major thoracic surgery . Pain is a key component in the alteration of lung function after thoracic surgery (2).

Patients experience painful wound incisions that alter chest wall mechanics and ineffective chest expansion may predispose to atelectasis, ventilation/ perfusion mismatching, hypoxemia and infection (3-4).

The goal of the clinician is to develop an analgesic regimen that provides effective pain relief to allow postoperative thoracotomy patients the ability to maintain their functional residual capacity by deep breathing . Effective clearing of secretions with cough and early mobilization can lead to quicker recovery and shorter length of hospital stay (5-6) .

Furthermore, inadequate acute postoperative pain management may contribute to the development of a chronic postthoracotomy pain syndrome (5-6).

Management of thoracotomy pain can be difficult, but the benefits of effective pain control are significant. A variety of modalities for treating postoperative pain after thoracotomy are available, including systemic opiates, regional analgesics, and new oral and parenteral agents (7).

Pain is a subjective experience and its management should be individually tailored (8).

Systemic opioids such as morphine and fentanyl are extremely effective in managing acute pain, and they remain the basis of postoperative analgesia. However, there is concern about their respiratory depressant side-effects (9).

Epidural Analgesia as the Mainstay of Postoperative Pain Management (10).

Clonidine was introduced into clinical practice in the 1966 as a centrally acting anti-hypertensive agent. It was first used for neurolptanalgesia in 1978. It is used for the treatment of migraine and

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menopausal flushing and also as an anaesthetic adjuvant (sedation, analgesia, anxiolysis, premedication) (11).

Epidurally administered clonidine produces dose-dependent analgesia not antagonized by opiate antagonists (12).

Dexmedetomidine prolongs the duration of both sensory and motor blockade induced by local anesthetics (13-14-15-16).

Material and Methods

Patients and methods:

This study was carried out at menofiya university hospital, the approval for this study was obtained from the institutional review board. Sixty patient at age rang from 18 to 60 undergoing thoracotomy was enrolled in this prospective hospital based comparative study with simple random technique after obtaining their informed consent. All patient was subjected to careful history, clinical examination, laboratory investigation, basal Spirometric function and arterial blood gases. During the preoperative visit they will be explained about the visual analogue scale (17).

Exclusion criteria included coagulopathy, morbid obesity, kyphosis or scoliosis, those with known sensitivity to any of our tested drugs, significant cardiovascular disease, active infectious process, neurological disorders, renal or hepatic failure, lack of cooperation, and inability to understand or perform verbal or physical assessments.

On arrival at the operative theatre, intravenous catheter and electrocardiograph leads was placed for continuous ECG monitoring. NIBP (non-invasive blood pressure) and SpaO2 (oxygen saturation) also was monitored. All patients was pre-medicated with midazolam 2.5 mg and 10 - 15ml / kg lactated ringer's solution given over 20 minutes. Our pt was informed in details about the process of epidural catheter insertion and its steps.

After positioning of patients. Identifying space T5-T6 was done then sterilizing back with iodine solution 10%. a 20-gauge epidural catheter placed through the needle and threaded.

By using closed envelope technique patients divided into 3 studied groups (20 patients each) who was receive the following :

-Group P (control group) received 10-12 ml bupivacaine 0.25% in the epidural catheter plus 1µg/kg fentanyl.

-Group D received 10-12 ml bupivacaine 0.25% plus 1µg/kg dexmedetomidine.

-Group C received 10-12 ml bupivacaine 0.25%plus clonidine 1µg/kg.

The loading dose in each group was given after careful aspiration for blood and cerebrospinal fluid .The time of injection of the loading dose was be considered the zero time of the study .

Heart rate , noninvasive blood pressure , respiratory rate and oxygen saturation will be recorded at 5, 10, 15, 20 and 30 minutes following the epidural injection .The onset of blockade was assessed by skin pin-prick method and number of dermatomes blocked was noted down.

After thirty minutes general anesthesia was induced using fentanyl (1µg/kg), thiopental (3–6 mg/kg) and cisatracurium (0.1-0.15 mg/kg), a double-lumen endotracheal tube was inserted (35-41) according to pt and ensuring the correct positon of tube by using fibroptic bronchscopy , inhalational anaesthetics (isoflurane) and controlled mechanical ventilation tidal volume 7 ml kg with 100% oxygen was used during study. Radial artery catheterization was performed for invasive blood pressure monitoring and arterial blood gas sampling. Hypotention considered when blood pressure decreased more than 20% of base line (fluid and ephedrine administered) Central venous line and urinary catheter was inserted. Entropy leads applied to forhead, the target range for entropy values is 40–60 and if light anathesia noted intravenous fentanyl given and increase isoflurane MAC (1.15).

Intraoperative top up doses in the form of (4-5 ml bupivacaine o.125%) was given every 1.5 hours.

After full recovery (regained airway control-cadiovasclar and respiratory stable) of patient he admitted to ICU and monitored for 24 h and during post-operative period analgesia given according to the Visual Analogue Score when it is more than 5 in the form of 4-5 ml bupivacaine (0.625%) plus 0.5µg/kg fentanyl in the control group, .2µg/kg dexmedetomidine or 50 µg clonidine in D and C group respectively. Perflgan was injected if patient still in pain (vas >50%).if no effect ketorlac given.

Table. Sedation score assessed by using Ramsay score at admission ICU, after 2 hours, after 6,12 and 24 hours.

score	description
1	Anxious, agitated
2	Cooperative, oriented
3	Drowsy but respond to commands
4	A sleep, respond to loud auditory stimulus
5	A sleep, sluggish response to loud auditory stimulus
6	Unarousable

Ramsay score[18].

Statistical Analysis:

The data collected were tabulated and analyzed by SPSS (statistical package for social science) version 22.0 on IBM compatible computer.

Two types of statistics were done:

Descriptive statistics:

e.g. percentage (%), mean and standard deviation (SD).

Analytic statistics: e.g.

- Chi-square test ($\chi 2$): was used to study association between two qualitative variables.
- -Paired t-test: is a test of significance used for comparison between two related groups having quantitative variables.
- -Wilcoxon signed rank test (nonparametric test): is a test of significance used for comparison between two related groups not normally distributed having quantitative variables.
- ANOVA (f) test: is a test of significance used for comparison between three or more groups having quantitative variables.
- -Kruskal-Wallis test (nonparametric test): is a test of significance used for comparison between three or more groups not normally distributed having quantitative variables.
- -Post hoc test: is done after significant ANOVA and Kruskal-Wallis test to explore significant difference between possible pair-wise comparison of means.
- The sample sizing assumes that the expected effect size is 1.12 and the standard deviation of outcome variable is 1.3.

To achieve 90% power to detect this difference with a significant level of 5% it is estimated that 28 subject per group would be required. With a withdrawal- non evaluable subject rate of 10% a total of 30per group subjects will be recruited leading to a total required sample size of 60 subjects.

Results

In the Table-1 we studied the blood pressure changes in in every group compared to the baseline during the intraoperative period we found that:
group p there was no significant changes in blood pressure at 5 (86.1±12.8), 10(85.0±19.1),15 (85.9±12.1), 20 (84.9±16.3) and 30 (86.6±11.5) minute after activation of epidural anesthesia compared to the baseline ,after induction of anesthesia there was also no significant change in Blood Pressure along the duration of surgery and at extubation (87.9±14.8).

-In group d there were significant decrease in blood pressure compared to the base line(84.2±6.6) at 10min (76.2±7.4), 15 mins (71.2±5.9), 20 min (61.4±8.3), 30min (62.6±10.1) after activation of epidural, this significant decrease continued at induction of anesthesia (56.2±6.8),5min after induction(56.1±10.2), after 10 min of every top up doseBP1(63.8±13.1), BP2(62.5±22.9),BP3 (58.2±30.4) and there is insignificant change during extubation (75.3±9.8).

In clonidine group (c group) there was significant decrease in BP 5 min (79.3±7.4), 10 min (71.3±13.7), 15 min (70.0±8.2), 20 min (62.5±11.0) and 30min (67.2±10.9) after activation of epidural .there is also significant decrease in BP after induction of anesthesia (63.0±8.0), 5 min after induction (64.4±10.4)), after 10 min of every top up doseBP1(61.9±10.5), BP2 (64.3±8.4), BP3 (50.8±34.4) at extubation Blood Pressure increased(80.9±11.8) but still showing significant decrease comparing to the base line (84.4±5.7).

In Table-2 we compared the mean blood pressure of the 3 groups Pre and intra- operative : 5 min after epidural injection group c showed significant difference (79.3±7.4) compared to group p (86.1±12.8) and no significant difference compared to group d (80.9±5.8) . 10 min after epidural injection group c also show significant difference compared to group p and no difference compared to group d . 15 min after epidural injection there is highly significant difference in comparing group p(85.9±12.1) and D (71.2±5.9), also in comparing group p and c (70.0±8.2) and no difference in comparing group d and c. after 20 min there was highly significant difference in comparing group p (84.9±16.3) and D (61.4±8.3), also in comparing group p and c (62.5±11.0) and no difference in comparing group d and c. after 30 min there was highly significant difference in comparing group p (86.6±14.6) and D (62.6±10.1), also in comparing group p and c (67.2±10.9) and no difference in comparing group d and c.

After induction of anesthesia there was highly significant difference in comparing group p (85.4±15.3) and D (56.2±6.8), also in comparing group p and c (63.0±8.0) and no difference in comparing group d and c. 5 min after induction of anesthesia there was highly significant difference in comparing group p (81.2±12.3) and D (56.1±10.2), also in comparing group p and c (64.4±10.4) and there was significant difference in comparing group d and c.

10 min after 1st top up dose there was highly significant difference in comparing group p (85.1±14.4) and D (63.8±13.1) also in comparing group p and c (61.9±10.5) and no difference in comparing group d and c. 10 min after 2nd top up dose there was highly significant difference in comparing group p(83.8±8.3) and D (69.4±8.7) also in comparing group p and c (64.3±8.4) and no difference in comparing group d and c. 10 min after 3rd top up dose there was significant difference in comparing group p(80.8±11.2) and D (72.8±6.6) also in comparing group p and c (72.6±5.1) and no difference in comparing group d and c. Immediately after extubation there was significant difference in comparing group p(87.9±14.8) and group d

(75.3±9.8) and no difference in comparing p and c (80.9±13.1) or in comparing d and c groups.

-In Table-3, we studied the blood pressure changes in in every group compared to the baseline during the postoperative period we found that: in group (p) there was no significant changes in blood pressure immediately at ICU admittion(84.6±11.3) ,after 2 hrs (85.6±13.9),6hrs (81.7±5.3) ,12 hrs(82.1±10.8) and after 24 hrs (87.6±9.5)

-in d group was no significant changes in blood pressure immediately at ICU admittion (84.0±11.3) ,after 2 hrs (84.8±10.0),6hrs (84.7±6.9) ,12 hrs(84.5±6.7.) and after 24 hrs (87.6±10.7)

- c group was no significant changes in blood pressure immediately at ICU admittion(83.1±9.6) ,after 2 hrs (81.3±8.7),6hrs (82.5±10.3) ,12 hrs(79.4±6.7.) and after 24 hrs (84.5±7.2).

In Table-4, we compared the postoperative mean arterial blood pressure changes of the 3 groups : immediately after admission to ICU there was no significant difference between the 3 groups p (84.6±11.3),d (84.0±11.3) and c (83.1±9.6). This continued after 2h p (85.6±13.9), d (84.8±10.0) and c (81.3±8.7), after 6h p (81.7±15.3), d (84.7±6.9) and c (82.5±10.3), after 12h p (82.1±10.8), d(84.5±6.8) and c (79.4±6.7) and after 24h p(87.6±9.5), d(83.4±7.7) and c(84.5±7.2).

-In table-5. table we studied the heart rate changes in every group compared to the baseline during the intraoperative period we found that in group p there was no significant in heart rate at 5 (81.9±5.8), 10(81.6±10.3), 15(81.0±9.0), 20(81.6±9.9) and 30(82.8±12.1) minute after activation of epidural anesthesia compared to the baseline, after induction of anesthesia there was also no significant change in heart rate along the duration of surgery except at extubation there was highly significant increase (91.1±13.5).

-In group d there were significant decrease in heart rate compared to the base line (78.1±6.6) at 5min (74.6±5.5), no significant change at10 min (71.9±11.1) but it decreased, 15 min (70.3±10.0), highly significant decreased at 20 min (65.8±7.7) and 30min (68.1±9.3) after activation of epidural, there was significant decrease at induction of anesthesia (73.8±7.0), 5min after induction(74.8±8.1) and it decreased 10 min after every top up dose Hr1(74.1±10.8), Hr2(67.7±25.5) but significally decreased at Hr3 (59.3±30.9) and there was significant increase during extubation (82.5±10.1) but less than group p.

- In clonidine group (c group) there was no significant change in heart rate at 5 min (76.5±7.3) and significally decreased at 10 min (72.9±12.2), 15 min (69.9±11.2), 20 min (61.6±7.8) and 30min (65.3±8.4) after activation of epidural there was also significant decrease in HR after induction of anesthesia (67.0±7.7), 5 min after induction (66.8±10.6) , after 10 min of every top up doseHR1(68.7±6.6), HR2(66.4±10.2),HR3(46.3±31.7 at extubation heart rate increased (82.3±8.8) but without significant comparing to the base line (78.5±4.0).

In table-6, we compared Pre and intra- operative the heart rate of the 3 groups : 5 min after epidural injection group d showed highly significant difference (74.6±5.5) compared to group p (81.9±5.8) and there is significant difference in comparing group p and group c (76.5±7.3) and no difference in comparing group d and c . 10 min after epidural injection group d (71.9±11.1) show significant difference compared to group p(81.6±10.3) and no difference compared to group c (72.9±12.2) . There is no significances in comparing group d , c. 15 min after epidural injection there is significant difference in comparing group p(81.0±9.0) and D (70.3±10.0), also in comparing group p and c (69.9±11.2) and no difference in comparing group d and c. after 20 min there is highly significant difference in comparing group p (81.6±9.9) and D (65.8±7.7), also in comparing group p and c (61.6±7.8) and no difference in comparing group d and c. after 30 min there is highly significant difference in comparing group p (82.8±12.1) and D (68.1±9.3), also in comparing group p and c (65.3±8.4) and no difference in comparing group d and c.

After induction of anesthesia there is highly significant difference in comparing group p (79.2±14.8) and c (67.0±7.7), significance in comparing group c and d (73.8±7.0) and no difference in comparing group d and p. 5 min after induction of anesthesia there is highly significant difference in comparing group p (80.5±7.7) and c (66.8±10.6), significance in comparing group p and d (74.8±8.1) and significance in comparing group d and c.

10 min after 1st top up dose there is highly significant difference in comparing group p(81.7±10.9) and c (68.7±6.6) , no significant difference in comparing group p and d (74.1±10.8) and also in comparing group d and c. 10 min after 2nd top up dose there is highly significant difference in comparing group p(82.00±8.7) and c (66.4±10.2), significant difference in comparing group p and d (74.1±10.8) and also in comparing group d and c. 10 min after 3rd top up dose there is no significant difference in comparing group p(67.3±35.9) and D (74.1±6.5) also in comparing group p and c (66.1±7.4) and in comparing group d and c. Immediately after extubation there is significant difference in comparing group p(91.1±13.5) and group d (82.5±10.1) also in comparing p and c(82.3±8.8) and no significant difference in comparing d and c groups.

In this table-7. we studied the heart rate changes in every group compared to the baseline during the postoperative period we found that in group (p) there was significant increase in heart rate immediately at ICU admittion(88.7±10.8) ,after 2 hrs (90.2±10.3),6hrs (89.7±7.6) ,12 hrs(87.1±4.9) and after 24 hrs (82.0±5.2).

-in d group was no significant changes in heart rate immediately at ICU admittion (82.4±12.9) ,after 2 hrs (78.9±10.02),6hrs (79.3±6.9) ,12 hrs(81.0±6.6) and after 24 hrs (84.7±10.6)

-c group was no significant changes in heart rate immediately at ICU admittion(82.0±12.6) ,after 2 hrs (83.5±13.1),6hrs (77.7±11.1) ,12 hrs(76.8±8.7) and after 24 hrs (78.4±3.9).

In Table-8, we compared the postoperative heart rate changes of the 3 groups : immediately after admission to ICU there was no significant difference between the 3 groups p (88.7±10.8),d (82.4±12.9) and c (82.0±12.6). after 2h there is significant difference in comparing group p (90.2±10.3), d (78.9±10.0) and no significant difference in comparing group p and c (83.5±13.1) or group d and c, after 6h of admission there is highly significant difference in comparing group p (89.7±7.6), d (79.3±6.9) and in comparing group p and c (77.3±11.1) and no significant difference in comparing group d and c. After 12h there is significant difference in comparing group p (87.1±4.9), d(81.0±6.6) , highly significant difference in comparing group p and c (76.8±8.7) and no difference in comparing group d and c and after 24h there is no significant difference in comparing group p(82.0±5.2), d(84.7±10.6), in comparing group p and c(78.4±3.9) and there is significant difference in comparing group d and c.

Discussion

Post-Thoracotomy Pain delays recovery and contributes significantly to postoperative morbidity. Acute incisional pain alters chest wall mechanics and impedes effective chest expansion, coughing and clearance of secretions predisposing to ventilation/perfusion mismatch, atelectasis, hypoxemia and infection(19).

There was significant decrease in blood pressure in dexmedetomidine group directly after activation of epidural and this decrease continued after induction of anesthesia and tell the end of operation where it slightly rised during extubation ephedrine was given to 16 patient from dose variant 25.5±20.7mg we noticed the same results as regarding clonidine group but with even more significant decrease in blood pressure 18 patient received ephedrine with much larger dose 42.0±30.6mg these changes in blood pressure weren't noticed in fentanyl group as blood pressure remained steady along the whale operation time with slight insignificant increase in blood pressure during extubation our results can be explained as these changes in blood pressure were mainly due to the additives (dexmedetomidine and clonidine) rather than epidural bupivacaine itself (.125%) which has no or very minimal effect on blood pressure. By comparing mean arterial blood pressure between our three studied groups we found that in pre and intra-operative period clonidine group showed significant decrease after 5 min. There is highly significant decrease after 10 min compared to fentanyl group till 30 min after epidural activation and no significant difference compared to dexmedetomidine group from 10 min till 30 min after epidural activation. After induction of anesthesia and after 10 min of each top up dose there is highly significant difference in comparing fentanyl group and clonidine group and no significant difference in comparing dexmedetomidine group and clonidine group. There was highly significant difference in comparing p and d group from 15 min after epidural activation to whole pre and intraoperative period At extubation there was significant difference in comparing fentanyl group and dexmedetomidine group and there is no significant difference in comparing fentanyl group and clonidine group or dexmedetomidine group and clonidine group.

As regarding the heart rate during the whole intraoperative period the fentanyl group showed no significant changes from the baseline except at time of extupation there was significant increase while both clonidine and dexmedetomidine showed significant decrease in heart rate up to 59.3±30.9 in dexmedetomidine group and 46.3±31.7 in clonidine group 50% of patients in dexmedetomidine group received atropine while in clonidine group up to 90% of our patients needed atropine this noticeable bradycardia could only be explained by the alpha 2 agonist effect of both dexmedetomidine and clonidine In comparing the 3 groups there is significant decrease in dexmedetomidine group compared to fentanyl group and also in clonidine group compared to fentanyl group and no significant difference in comparing dexmedetomidine group and clonidine group. At extubation there is significant increase in fentanyl group compared to clonidine and dexmedetomidine group and no difference in comparing dexmedetomidine group and clonidine group.

Our results agrees with the study done by Sukhminder Jit Singh Bajwa, Sukhwinder Kaur Bajw and Jasbir Kau at which Epidural block was administered with 20 ml of ropivacaine 0.75% (group R) and ropivacaine 0.75% and clonidine 75 µg (group RC) Fifty one patients undergoing caesarian section were enrolled in this study and were subjected to statistical analysis the incidence of bradycardia and hypotension was more in RC group as compared to R group and was statistically(20).

After full recovery from anesthesia our patients were transformed to ICU in which they were monitored for 24 hours as considering post-operative analgesia VAS was done for all the patients in 2 hour intervals the following was found immediately after admission to ICU none of the patients required further analgesia as the VAS was(2.7±2.4) (0.4±1.2) (1.6±1.5) in fentanyl, dexmedetomidine and clonidine groups. After 2h fentanyl group needed analgesia as VAS was

(6.1±1.6) but both dexmedetomidine and clonidine didn't require further analgesia although there was significant increase in clonidine group(3.2±2.1) compared to dexmedetomidine group(0.2±0.6) this continued after 6 hours but after twelve hours both fentanyl(5.7±0.9) and clonidine (5.2±1.0) groups required analgesia while patients receiving dexmedetomidine remained satisfied (0.2±0.6) after 24 hours our patients started to ambulate and begin oral intake and the pain generally decrease in all the groups with more comfortable and satisfaction in dexmedetomidine group as VAS REMAINED 3.2±1.4. In fentanyl group all patients received perfalgane and ketorlac, in clonidine 12 patients required perfalgan only 4 of them needed further dose of ketorlac while dexmedetomidine 2 patient required perfagane and non-needed ketorlac . our result agree with study done by Ashraf M. Eskandar, Ayman M. Ebeid, MD at which 50 patients were 40–60 years of age of both sexes, had ASA physical status I–III, were admitted to Menoufiya University and who were undergoing elective total knee arthroplasty were randomly divided into two equal groups: group D received 2.5 ml of a mixture of bupivacaine 0.125% and dexmedetomidine 0.2 µg/kg/h and group B received only 0.125% bupivacaine 5 ml/h for postoperative analgesia. Postoperative pain was scored by visual analogue scale; sedation score and cardiorespiratory parameters were recorded every 6 h for 48 h postoperatively. Data were recorded and statistically analyzed they found that Epidural dexmedetomidine reduced postoperative VAS at rest and movement(21). Mohamed Fouad Selim, Ali Mohamed Ali Elnabtity, and Ali Mohamed Ali Hasan made Comparative evaluation of epidural bupivacaine – dexmedetomidine and bupivacaine –fentanyl on Doppler velocimetry of uterine and umbilical arteries during labor All women laboring without analgesia (control group) admitted to the labor ward immediately and enrolled in the study as controls when meeting inclusion criteria. The control group received no analgesics; patient who requested analgesia during study period was excluded from the study.

hundred women who had requested epidural analgesia for labor were randomly allocated to two groups (n = 50 each), to receive 12 ml of 0.25% bupivacaine plus either 1 µg/kg dexmedetomidine diluted in 5 ml saline (BD group) or 1 µg/kg fentanyl diluted in 5 ml saline (BF group). They found that VAS significantly decreased after epidural compared with control group. BD group showed significant improvement in onset and duration of analgesia(22).

Also the level of sedation of our patients assessed we noticed that no difference between fentanyl and clonidine group but sedation is markedly observed in dexmedetomidine group this due to activation of presynaptic alpha-2 receptors in the locus cerulous which inhibit the release of noreepinephrine. Inhibition of adenylate cyclase may also be implicated in the hypnotic response of dexmedetomidine(23).

This agreed with study of preoperative effect of epidural dexmedetomidine with intrathecal bupivacaine on haemodynamic parameters and quality of analgesia done by Jain D, Khan RM and Kumar D at which 60 male patients ASA I, II between age 20-50 years and posted for lower limb orthopedic surgery. The patients randomly divided in to 2 groups using manual envelope randomization technique. Group 1 receives 2.5 ml of .5% bupivacaine intrathecal, plus 10 ml normal saline epidurally (control). Group 2 receive 2.5 ml of .5% bupivacaine intrathecally plus 2 mq/kg dexmedetomidine epidurally made up to 10 ml with normal saline (study). The majority of the patients in Group II were sedated (arousable by verbal commands, or light tactile stimulus, sedation scale 3-4) 10±5 minutes following administration of dexmedetomidine in the epidural space. This decrease in the level of consciousness lasted for 45 ± 5 minutes (24).

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

References

1. Brewer RJ, Walsh GL, Anesthesia for thoracic surgery in the Oncology patient, Anesthesiol Clin North Am, 1998;(16):605- 28.
2. Richardson J, Sabanathan S, Shah R, Post-thoracotomy spirometric lung function: the effect of analgesia, J Cardiovasc Surg, 1999; (40):445-56.
3. Kruger M, McRae K, Pain management in cardiothoracic Practice, Surg Clin North Am, 1999; (79): 387- 400.
4. Silimon M, Claus T, Huwer H, Interpleural analgesia does not influence postthoracotomy pain, Anesth Analg, 2000; (91):44- 50.
5. Reilly JJ Jr, Preoperative and postoperative care of standard and high-risk surgical patients, Hematol Oncol Clin North Am, 1997; (11):449-59.
6. Katz J, Jackson M, Kavanagh BP, Acute pain after thoracic surgery predicts long-term post-thoracotomy pain, Clin J Pain , 1996; (12):50–5.
7. Roy G., Eugene S. Fu, acute pain management of patient undergoing thoracotomy, Ann Thorac Surg , 2003; (75):1349 – 57.
8. Wall PD, The prevention of postoperative pain, Pain, 1988; (33): 289- 9.
9. Roy, Eugene S. Fu G. acute pain management of patient undergoing, thoracotomy, Ann Thorac Sur ,, 2003; (75):1349-57.

10. Ferrante FM, Acute postoperative pain management, Morgan GE Jr, 2nd , Mosby, 1998; 2331- 51.
11. Kaukinen S, Kaukinen L, Eerola R. Preoperative and postoperative use of clonidine with neurolept anaesthesia. Acta Anaesthesiol Scand. 1978;23:113- 20.
12. Aantaa R, Scheinin M. Alpha 2 adrenergic agents in Anaesthesia. Acta Anaesthesiol Scand 1993;37:433- 38.
13. Schnaider TB, Vieira AM, Brandao AC. Intraoperative analgesic effect of epidural ketamine, clonidine or dexmedetomidine for upper abdominal surgery. Rev Bras Anestesiol 2005;55:525-31.
14. Mauro VA. Brandão ST. Clonidine and dexmedetomidine through epidural route for post-operative analgesia and sedation in a cholecistectomy. Rev Bras Anestesiol. 2004;4:1-10.
15. El-Hennawy AM, Abd-Elwahab AM, Abd-Elmaksoud AM. Addition of clonidine or dexmedetomidine to bupivacaine prolongs caudal analgesia in children. Br J Anaesth 2009;103:268-74.
16. Kanazi GE, Aouad MT, Jabbour-Khoury SI. Effect of low-dose dexmedetomidine or clonidine on the characteristics of bupivacaine spinal block. Acta Anaesthesiol Scand 2006;50:222-7.Meet Shah, Sumanth Shivaswamy, Sanjay Jain, Sonal Tambwekar, A clinical comparison of pain perception and extent of area anesthetized by Wand and a traditional syringe, Journal of Indian Society of Periodontology .2012;16(2): 207- 12.
17. Ramsay M, Savege T, Simpson BRJ, The Ramsay Scale. Controlled sedation with alphaxalone/alphadolone. BMJ 1974;2:656– 69.
18. Staffan Wahlander, MD, Robert J. Frumento, MS, MPH, Gebhard Wagener, MD, Dexmedetomidine as an Adjunct to Epidural Analgesia After Thoracic Surgery, Journal of Cardiothoracic and Vascular Anesthesia,2005;19:630-35.
19. Sukhminder Jit Singh Bajwa, Sukhwinder Kaur Bajwa and Jasbir Kaur, Comparison of epidural ropivacaine and ropivacaine clonidine combination for elective cesarean sections, Indian J Anaesth 2011;55(2):116-121.
20. Ashraf M. Eskandar , Ayman M. Ebeid, Effects of epidural dexmedetomidine and low-volume bupivacaine on postoperative analgesia after total knee replacement, Ain-Shams Journal of Anesthesiology 2014;07:193- 7.
21. Mohamed Fouad Selim, Ali Mohamed Ali Elnabtity, and Ali Mohamed Ali Hasan, Comparative evaluation of epidural bupivacaine – dexmedetomidine and bupivacaine –fentanyl on Doppler velocimetry of uterine and umbilical arteries during labor, J Prenat Med. 2012;6(3):47-54.
22. Memis D, Turan A and Karamanlioglu B, adding dexmedetomidine to lidocaine for intravenous regional anathesia., Anesth analg. 2004;98(3):835-840.
23. Jain D, Khan RM, Kumar D, Perioperative effect of epidural dexmedetomidine with intrathecal bupivacaine on haemodynamic parameters and quality of analgesia, South Afr J Anaesth Analg 2012;18(1):105-9.

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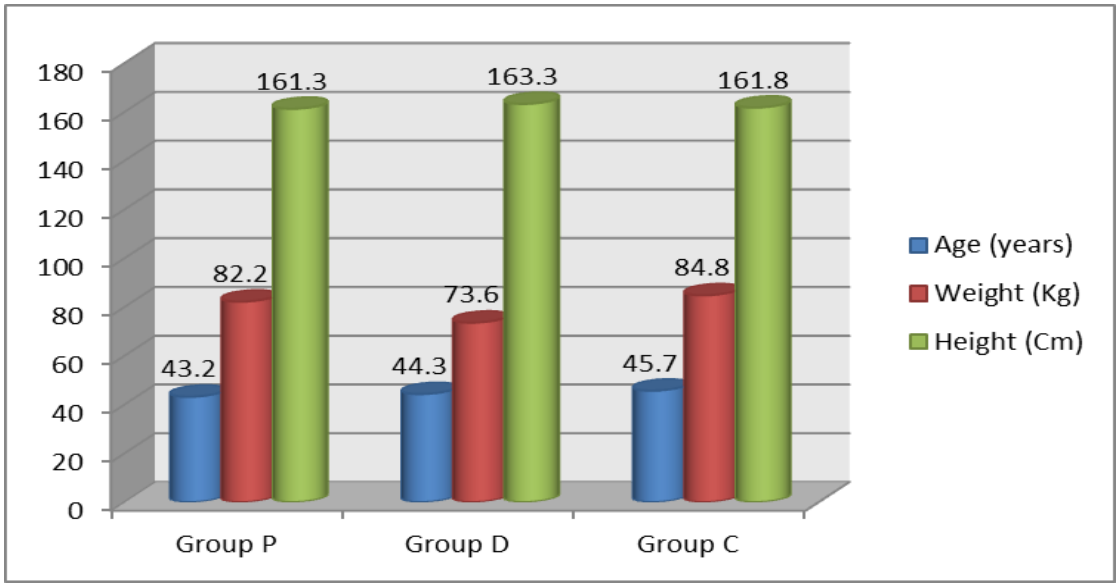
Figure-1 & 2. Patients characteristics in studied groups.



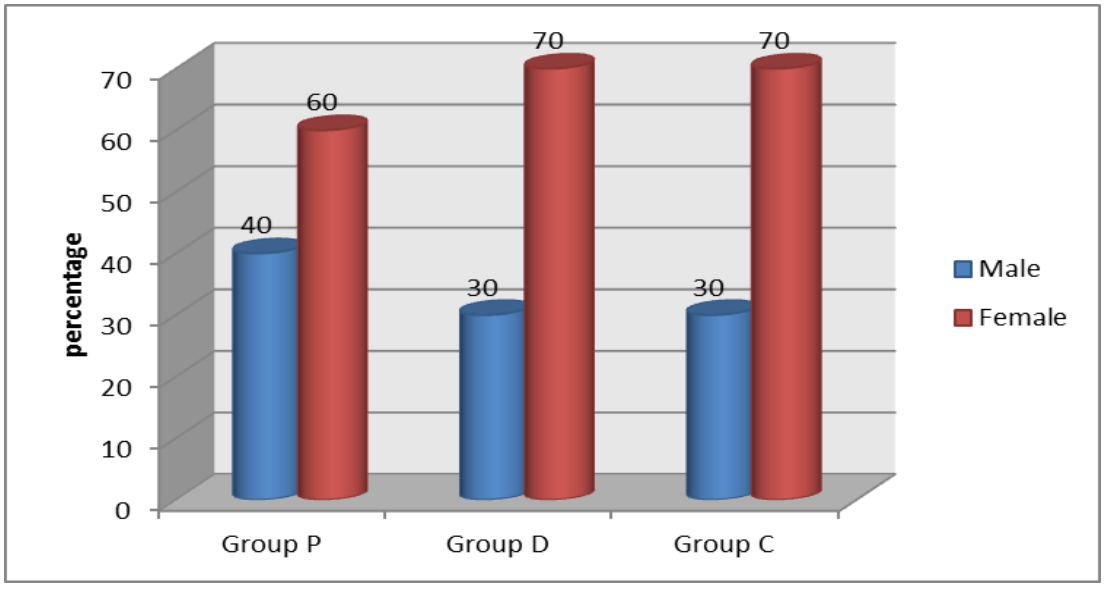
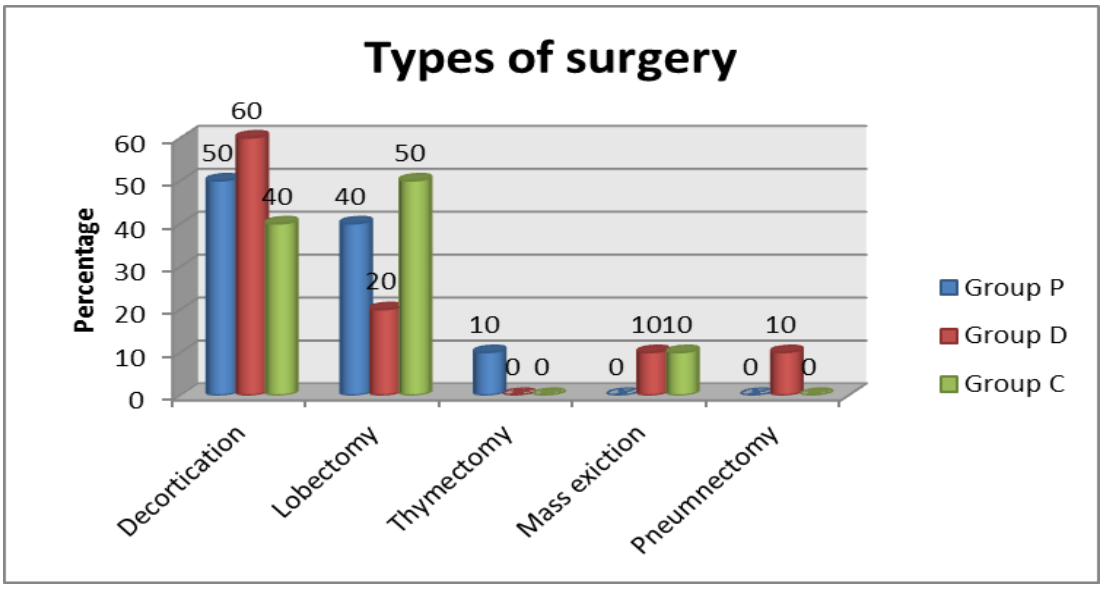


Figure-3 & 4. Surgical data in studied groups.



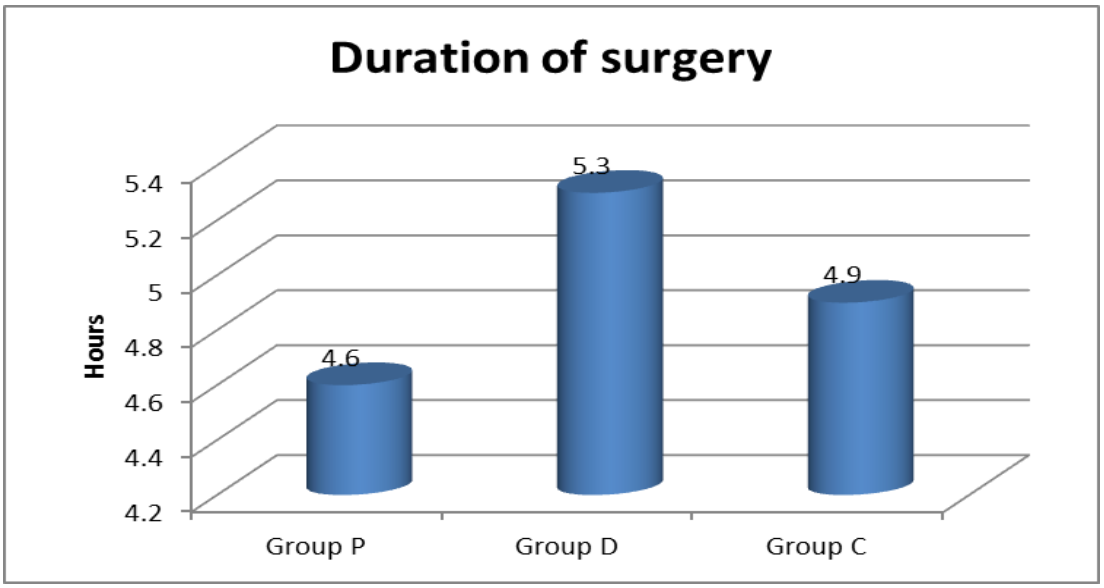


Table-1. Pre and intra-operative mean arterial blood pressure changes within the same group

Group	Pre operative Base line	5 min.	10 min.	15 min.	20 min.	30 min.	Intraoperative base line
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
P=20	86.6±11.47	86.1±12.8	85.0±19.1	85.9±12.1	84.9±16.3	86.6±11.5	85.4±15.3
P value	----	0. 89	0.76	0.85	0.70	1.00	0.68
D=20	84.2±6.6	80.9±5.8	76.2±7.4	71.2±5.9	61.4±8.3	62.6±10.1	56.2±6.8
P value	---	0.08	0.002*	<0.001**	<0.001**	<0.001**	<0.001**
C=20	84.4±5.7	79.3±7.4	71.3±13.7	70.0±8.2	62.5±11.0	67.2±10.9	63.0±8.0
P value	--	0.002*	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**

Paired t- test*Significant difference **Highly significant difference

Table-2. comparison of Pre and intra- operative mean arterial blood pressure changes in between the studied groups:

Time(min.)	Group	NO	Mean±SD	F test	P value	Post Hoc
Preoperative base line ABP	P	20	86.6±11.5			P1=0.37
	D	20	84.2±6.6	0.51	0.60	P2=0.41
	C	20	84.2±5.7			P3=0.94
After 5 min. following epidural	P	20	86.1±12.8			P1=0.08
	D	20	80.9±5.8	3.00	0.06	P2=0.02*
	C	20	79.3±7.4			P3=0.58
After 10 min. following epidural	P	20	85.0±19.1			P1=0.06
	D	20	76.2±7.4	4.77	0.01*	P2=0.003*
	C	20	71.3±13.7			P3=0.28
After 15 min. following epidural	P	20	85.9±12.1			P1=<0.001**
	D	20	71.2±5.9	18.91	<0.001**	P2=<0.001**
	C	20	70.0±8.2			P3=0.68
After 20 min. following epidural	P	20	84.9±16.3			P1=<0.001**
	D	20	61.4±8.3	23.13	<0.001**	P2=<0.001**
	C	20	62.5±11.0			P3=0.78
After 30 min. following epidural	P	20	86.6±14.6			P1=<0.001**
	D	20	62.6±10.1	22.49	<0.001**	P2=<0.001**
	C	20	67.2±10.9			P3=0.23
ABP base after anesthesia	P	20	85.4±15.3			P1=<0.001**
	D	20	56.2±6.8	40.59	<0.001**	P2=<0.001**
	C	20	63.0±8.0			P3=0.05
After 5 min. after anesthesia	P	20	81.2±12.3			P1=<0.001**
	D	20	56.1±10.2	26.87	<0.001**	P2=<0.001**
	C	20	64.4±10.4			P3=0.02*
ABP10 (1) after anesthesia	P	18	85.1±14.4			P1=<0.001**
	D	20	63.8±13.1	19.21	<0.001**	P2=<0.001**
	C	20	61.9±10.5			P3=0.64
ABP10 (2) after anesthesia	P	20	83.8±8.3			P1=<0.001**
	D	18	69.4±8.7	9.77	<0.001**	P2=<0.001**
	C	20	64.3±8.4			P3=0.08
ABP10 (3) after anesthesia	P	16	80.8±11.2			P1=0.007*
	D	16	72.8±6.6	0.85	0.007*	P2=0.008*
	C	14	72.6±5.1			P3=0.95
ABP extub.	P	20	87.9±14.8			P1=0.002*
	D	20	75.3±9.8	5.28	0.008*	P2=0.08
	C	20	80.9±13.1			P3=0.16

P1----------comparison between P and D groups
P2----------comparison between P and C groups
P3----------comparison between D and C groups
*Significant difference **Highly significant difference

Table-3. Post-operative mean arterial blood pressure changes within the same group.

Group	Preoperative Base line	post operative Base line	After 2hr.	After 6hr.	After 12hr.	After 24hr.
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
P=20	86.6±11.47	84.6±11.3	85.6±13.9	81.7±5.3	82.1±10.8	87.6±9.5
P value	----	0.37	0.77	0.13	0.09	0.62
D=20	84.2±6.6	84.0±11.3	84.8±10.0	84.7±6.9	84.5±6.7	87.7±10.7
P valve	---	0.94	0.83	0.84	0.86	0.10
C=20	84.4±5.7	83.1±9.6	81.3±8.7	82.5±10.3	79.4±6.7	84.5±7.2
P valve	---	0.54	0.25	0.54	0.05	0.95

Paired t- test *Significant difference

Table-4. Comparison of Post- operative mean arterial blood pressure changes in between the studied groups:

Time(min.)	Group	NO	Mean±SD	F test	P value
ABP base in ICU	P	20	84.6±11.3	0.09	0.91
	D	20	84.0±11.3		
	C	20	83.1±9.6		
After 2 hr. in ICU	P	20	85.6±13.9	0.85	0.43
	D	20	84.8±10.0		
	C	20	81.3±8.7		
After 6hr. in ICU	P	20	81.7±15.3	0.36	0.69
	D	20	84.7±6.9		
	C	20	82.5±10.3		
After 12hr. in ICU	P	20	82.1±10.8	1.87	0.16
	D	20	84.5±6.8		
	C	20	79.4±6.7		
After 24hr. in ICU	P	20	87.6±9.5	1.41	0.25
	D	20	83.4±7.7		
	C	20	84.5±7.2		

Table-5. Pre and intra-operative heart rate changes within the same group.

Group	Pre operative Base line	5 min.	10 min.	15 min.	20 min.	30 min.	Intraoperative base line	HR 5	HR 10-1	HR 10-2	HR 10-3	HR Extub.
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mea±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
P=20	97.5±5.4	81.9±5.8	81.6±10.3	81.0±9.0	81.6±9.9	82.8±12.1	79.2±14.8	80.5±7.7	81.7±10.1	82.0±8.7	67.3±35.9	91.1±13.5
P value	----	0.15	0.39	0.51	0.45	0.29	0.92	0.60	0.44	0.24	0.14	<0.001**
D=20	78.1±6.6	74.6±5.5	71.9±11.1	70.3±10.0	65.8±7.7	68.1±9.3	73.8±7.0	74.8±8.1	74.1±10.8	67.7±25.5	59.3±30.9	82.5±10.1
P valve	---	0.04*	0.03	0.001	<0.001**	<0.001**	0.001*	0.004*	0.11	0.05	0.009*	0.02*
C=20	78.5±4.0	76.5±7.3	72.9±12.2	69.9±11.2	61.6±7.8	65.3±8.4	67.0±7.7	66.8±10.6	68.7±6.6	66.4±10.2	46.3±31.7	82.3±8.8
P value	--	0.26	0.04*	0.002*	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**	0.05

Paired t- test*Significant difference **Highly significant difference

Table-6. Comparison of pre and intraoperative heart rate changes in between the studied groups:

Time(min.)	Group	NO	Mean±SD	F test	P value	Post Hoc
Preoperative base line HR	P	20	79.5±5.4			P1=0.42
	D	20	78.1±6.5	0.36	0.70	P2=0.56
	C	20	78.5±4.0			P3=0.82
After 5 min. following epidural	P	20	81.9±5.8			P1=<0.001**
	D	20	74.6±5.5	7.54	0.001*	P2=0.008*
	C	20	76.5±7.3			P3=0.33
After 10 min. following epidural	P	20	81.6±10.3			P1=0.008*
	D	20	71.9±11.1	4.51	0.02*	P2=0.02*
	C	20	72.9±12.2			P3=0.78
After 15 min. following epidural	P	20	81.0±9.0			P1=0.001*
	D	20	70.3±10.0	7.74	0.001*	P2=0.001*
	C	20	69.9±11.2			P3=0.90
After 20 min. following epidural	P	20	81.6±9.9			P1=<0.001**
	D	20	65.8±7.7	30.56	<0.001**	P2=<0.001**
	C	20	61.6±7.8			P3=0.13
After 30 min. following epidural	P	20	82.8±12.1			P1=<0.001**
	D	20	68.1±9.3	17.51	<0.001**	P2=<0.001**
	C	20	65.3±8.4			P3=0.38
HR base after anesthesia	P	20	79.2±14.8			P1=0.11
	D	20	73.8±7.0	6.88	0.002*	P2=<0.001**
	C	20	67.0±7.7			P3=0.04*
After 5 min. after anesthesia	P	20	80.5±7.7			P1=.04*
	D	20	74.8±8.1	11.94	<0.001**	P2=<0.001**
	C	20	66.8±10.6			P3=0.006*
HR 10 (1) after anesthesia	P	20	81.7±10.9			P1=0.01
	D	20	74.1±10.8	9.72	<0.001**	P2=<0.001**
	C	20	68.7±6.6			P3=0.07
HR 10 (2) after anesthesia	P	20	82.00±8.7			P1=0.04*
	D	20	75.2±11.3	12.00	<0.001**	P2=<0.001**
	C	20	66.4±10.2			P3=0.009*
HR 10 (3) after anesthesia	P	20	67.3±35.9			P1=0.39
	D	20	74.1±6.5	054#	0.59	P2=0.89
	C	20	66.1±7.4			P3=0.36
HR extub.	P	20	91.1±13.5			P1=0.02*
	D	20	82.5±10.1	4.22	0.02*	P2=0.01*
	C	20	82.3±8.8			P3=0.95

P1----------comparison between P and D groups
P2----------comparison between P and C groups
P3----------comparison between D and C groups
#Kruskal Wallis test *Significant difference **Highly significant difference
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Table-7. Post-operative heart rate changes within the same group.

Group	Preoperative Base line	Post- operative Base line	After 2hr.	After 6hr.	After 12hr.	After 24hr.
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
P=20	79.5±5.4	88.7±10.8	90.2±10.3	89.7±7.6	87.1±4.9	82.0±5.2
P value	----	0.002*	<0.001**	<0.001**	<0.001**	0.18
D=20	78.1±6.6	82.4±12.9	78.9±10.02	79.3±6.9	81.0±6.6	84.7±10.6
P valve	---	0.16	0.75	0.57	0.25	0.03*
C=20	78.5±4.0	82.0±12.6	83.5±13.1	77.7±11.1	76.8±8.7	78.4±3.9
P valve	---	0.14	0.07	0.63	0.41	0.94

Paired t- test *Significant difference **Highly significant difference

Table-8. Comparison of Post-operative heart rate changes in between the studied groups.

Time(min.)	Group	NO	Mean±SD	F test	P value	Post Hoc
HR base in ICU	P	20	88.7±10.8			P1=0.11
	D	20	82.4±12.9	1.91	0.16	P2=0.09
	C	20	82.0±12.6			P3=0.92
After 2 hr. in ICU	P	20	90.2±10.3			P1=0.002*
	D	20	78.9±10.0	5.13	0.009*	P2=0.06
	C	20	83.5±13.1			P3=0.20
After 6hr. in ICU	P	20	89.7±7.6			P1=<0.001**
	D	20	79.3±6.9	11.57	<0.001**	P2=<0.001**
	C	20	77.3±11.1			P3=0.47
After 12hr. in ICU	P	20	87.1±4.9			P1=0.007*
	D	20	81.0±6.6	11.21	<0.001**	P2=<0.001**
	C	20	76.8±8.7			P3=0.06
After 24hr. in ICU	P	20	82.0±5.2			P1=0.24
	D	20	84.7±10.6	3.89	0.03*	P2=0.12
	C	20	78.4±3.9			P3=0.007*

P1----------comparison between P and D groups
P2----------comparison between P and C groups
P3----------comparison between D and C groups
*Significant difference **Highly significant difference

Table-9. Post- operative Visual Analog Scale (VAS) in the studied groups.

Time(min.)	Group	NO	Mean±SD	Kruskal Wallis test	P value	Post Hoc
VAS base	P	20	2.7±2.4	2.59	0.001*	P1=<0.001**
	D	20	0.4±1.2			P2=0.06
	C	20	1.6±1.5			P3=0.04
VAS 2	P	20	6.1±1.6	2.91	<0.001**	P1=<0.001**
	D	20	0.2±0.6			P2=<0.001**
	C	20	3.2±2.1			P3=<0.001**
VAS 6	P	20	5.3±2.1	7.78	<0.001**	P1=<0.001**
	D	20	2.6±1.3			P2=0.02*
	C	20	3.8±2.3			P3=0.06
VAS 12	P	20	5.7±0.9	1.61	<0.001**	P1=<0.001**
	D	20	2.4±2.0			P2=0.26
	C	20	5.2±1.0			P3=<0.001**
VAS 24	P	20	4.3±0.9	1.98	0.003*	P1=0.005*
	D	20	3.2±1.4			P2=0.79
	C	20	4.4±1.2			P3=0.002*

*Significant difference **Highly significant difference
P1----------comparison between P and D groups
P2----------comparison between P and C groups
P3----------comparison between D and C groups

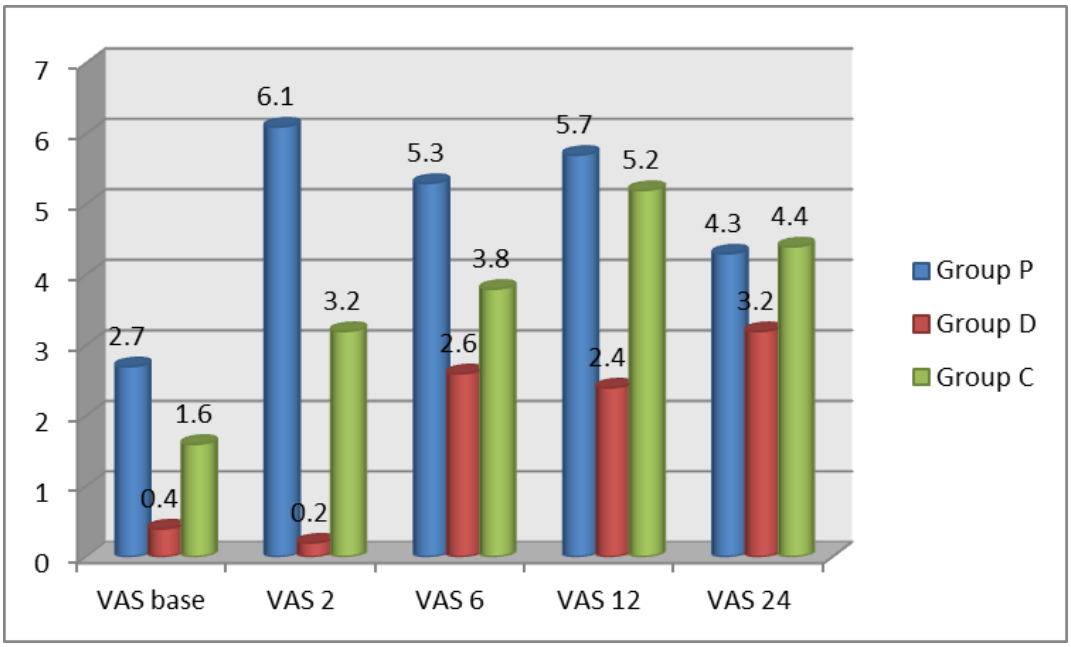

Table-10. Post- operative Sedation Score (RS) in the studied groups.

Time (min.)	Group	NO	Mean±SD	F test	P value	Post Hoc
RS base	P	20	2.0±0.65	4.75	0.01*	P1=0.01*
	D	20	2.4±0.50			P2=1.00
	C	20	2.0±0.0			P3=0.01*
RS2	P	20	1.3±0.47	23.82	<0.001**	P1=<0.001**
	D	20	2.3±0.47			P2=0.19
	C	20	1.5±0.51			P3=<0.001**
RS 6	P	20	1.4±0.50	14.08	<0.001**	P1=<0.001**
	D	20	2.1±0.31			P2=0.49
	C	20	1.5±0.51			P3=<0.001**
RS 12	P	20	1.2±0.41	22.71	<0.001**	P1=<0.001**
	D	20	2.0±0.00			P2=0.02
	C	20	1.5±0.51			P3=<0.001**
RS 24	P	20	1.7±0.47	5.85	0.005*	P1=0.001*
	D	20	2.1±0.31			P2=0.09
	C	20	1.9±0.31			P3=0.09

*Significant difference **Highly significant difference
P1----------comparison between P and D groups
P2----------comparison between P and C groups
P3----------comparison between D and C groups