Epidural levobupivacaine and dexmedetomidine versus levobupivacaine and fentanyl for arthroscopic knee surgeries

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Abstract

Several adjuvant drugs have been used in combination with the epidural local anesthetic in order to improve the quality of motor block and prolong the duration of postoperative analgesia. These adjuvants include opioids as morphine, fentanyl and sufentanil, α-2agonists as clonidine and dexmedetomidine, magnesium sulphate and neostigmine. Aim: to compare the onset and duration of sensory and motor block, as well as hemodynamic changes and level of sedation following epidural levobupivacaine supplemented with dexmedetomidine and fentanyl in patients undergoing arthroscopic knee surgeries. Methods: Prospective, double blind randomized clinical study, Patients undergoing arthroscopic knee surgeries, Ninety Patients were randomly allocated into three equal groups.1-Group L (n = 30): (receive levobupivacaine). Patients were given a total 17cc solution consisting of 15 cc Levobupivacaine 0.5% (Chirocaine® levobupivacaine base as the HCL salt 5mg/ml, 10 ml vial Abbott Laboratories) with 2 cc of isotonic sodium chloride solution.2- Group LF (n = 30): (receive Levobupivacaine + Fentanyl). Patients in this group received17cc solution consisting of 15cc Levobupivacaine 0.5% with a 2cc volume of 1ug/kg Fentanyl (fentanyl Haemeln.2ml 50µg/ml of fentanyl citrate).3- Group LD (n = 30): (receive levobupivacaine + Dexmedetomidine). Patients in this group received17cc solution consisting of 15cc Levobupivacaine 0.5% with a 2cc volume of 1ug/kg dexmedetomidine (Dexmedetomidine hydrochloride (Precedex®, supplied in 100 µg /mL manufactured by Hospira, Inc. Lake Forest, IL, USA) plus normal saline. Results: There was statistically highly significant difference in onset of sensory block, time to achieve peak sensory level, two segment regression time and duration of sensory block among the three groups ($p < 0.01$). The Number & % of patients requiring rescue analgesia were more in group (L)as compared to group (LF) and group (LD), which was statistically significant ($p<0.05$). The incidence of pruritis was significantly higher in (LF) group and it was statistically highly significant on comparison ($P < 0.01$). The incidence of other side effects like hypotension, bradycardia, nausea, vomiting and shivering, were comparable in the three groups and statistically non-significant. We did not observe the respiratory depression or O2 desaturation in any patient from any group. Conclusion: Use of dexmedetomidine as an adjuvant to levobupivacaine was a good alternative to other adjuvants like fentanyl in epidural anesthesia. Both fentanyl and dexmedetomidine provided adequate sensory, motor block and their side effects were well tolerated by the patients but dexmedetomidine had an edge over fentanyl as adjuvant when used with levobupivacaine in epidural anesthesia..

Keywords: Epidural levobupivacaine. Dexmedetomidine, levobupivacaine, fentanyl, arthroscopic knee

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1. Introduction

Several adjuvant drugs have been used in combination with the epidural local anesthetic in order to improve the quality of motor block and prolong the duration of postoperative analgesia. These adjuvants include opioids as morphine, fentanyl and sufentanil, α-2agonists as clonidine and dexmedetomidine, magnesium sulphate and neostigmine. (1)

Unfortunately, there is always a possibility of an increased incidence of pruritis, urinary retention, nausea, vomiting and respiratory depression. (2)

α-2 adrenergic agonists have both analgesic and sedative properties when used as an adjuvant in regional anesthesia. (3)

The stable hemodynamics and the decreased oxygen demand due to enhanced sympathoadrenal stability make them very useful pharmacologic agents. (4)

Dexmedetomidine does cause a manageable hypotension and bradycardia but the striking feature of this drug is the lack of opioid related side effects like respiratory depression, pruritis, nausea, and vomiting. (5)

The purpose of this study was to compare the onset and duration of sensory and motor block, as well as hemodynamic changes and level of sedation following epidural levobupivacaine supplemented with dexmedetomidine and fentanyl in patients undergoing arthroscopic knee surgeries.

Patient and methods

Ethics Committee:

- The study protocol was approved by the institutional ethical committee of Cairo university hospitals. Informed patient written consent was obtained before enrolment in the study.

Type of Study:

Prospective, double blind randomized clinical study.

Methods of randomization:

Patients were randomized into three equal groups. An online randomization program was used to generate random number list. Patient randomization numbers were concealed in opaque envelops which were opened by the study investigator.

Methods of blindness:

Members of the study group involved in obtaining functional data were blinded to randomization for the period of data acquisition and analysis.

Inclusion Criteria:

Patients of either sex.

Age from 20 to 50 years.

ASA physical status: I, II.

Body weighting below 100 kg.

Type of operations: Patients undergoing arthroscopic knee surgeries.

Exclusion criteria included:

Age: younger than 20 years and older than 50 years.

ASA physical status ≥ III.

Body weight ≥ 100 kg.

Contraindications for regional anesthesia.

Patients receiving α-adrenergic antagonist.

Patients with severe cardiac disease, bronchial asthma, chronic obstructive lung disease, history of

sleep apnea, serum creatinine>200umol/L, advanced liver disease (liver enzymes twice the normal range or higher)

History of chronic use of sedatives, narcotics, alcohol or drugs.

Those who were unable to perform a visual analogue scale (VAS).

Groups allocation:

Ninety Patients were randomly allocated into three equal groups.

1-Group L (n = 30): (receive levobupivacaine)

Patients were given a total 17cc solution consisting of 15 cc Levobupivacaine 0.5% (Chirocaine® levobupivacaine base as the HCL salt 5mg/ml, 10 ml vial Abbott Laboratories) with 2 cc of isotonic sodium chloride solution.

2- Group LF (n = 30): (receive Levobupivacaine + Fentanyl)

Patients in this group received17cc solution consisting of 15cc Levobupivacaine 0.5% with a 2cc volume of 1ug/kg Fentanyl (fentanyl Haemeln.2ml 50μg/ml of fentanyl citrate).

3- Group LD (n = 30): (receive levobupivacaine + Dexmedetomidine)

Patients in this group received17cc solution consisting of 15cc Levobupivacaine 0.5% with a 2cc volume of 1ug/kg dexmedetomidine (Dexmedetomidine hydrochloride (Precedex®, supplied in 100 μg /mL manufactured by Hospira, Inc. Lake Forest, IL, USA) plus normal saline.

Patient Preparation:

One day before surgery all patients were interviewed to explain visual analogue scale (VAS), Also routine investigations in the form of 12 leads electrocardiography (ECG), complete blood count (CBC), coagulation profile (bleeding time, prothrombin time, international normalized ratio and partial thromboplastin time), liver functions and kidney functions.

All patients fasted for 8 hours preoperatively and were premedicated with injected metoclopramide 10 mg intravenously.

In the operation theatre, an 18-gauge intravenous (IV) catheter will be placed and 10 ml\Kg of Ringer's acetate solution are infused IV over 15-30 minutes for prophylactic volume preload before induction of anesthesia and monitoring devices will be attached which include electrocardiograph (ECG) using(GE-Datex Ohmeda 5 lead ECG cable), pulse oximetry (SpO2) using(GE- Datex Ohmeda adult finger spO2 sensor) , non-invasive blood pressure (NIBP) using (GE-Datex Ohmeda NIBP cuff, adult double tube with bag), respiratory rate and the baseline parameters will be recorded. The drug syringes will be prepared by an anesthesia technician who is unaware of the study design.

Regional block technique:

After complete aseptic technique, local anesthesia with 3 mL of 2% lidocaine will be performed, the epidural space is located at the L2–L3 or L3–L4 interspaces using the midline approach and a loss of resistance technique with the patients placed in the sitting position. Then, a 20-gauge epidural catheter is introduced 2 to 3 cm into the epidural space. After a negative aspiration test, 3 mL of 2% lidocaine with epinephrine 1:200000 will be injected as a test dose.

After 4–6 minutes of administering the test dose, local anesthetic mixture was injected. It should be administered in incremental doses of 3 to 5 ml with sufficient time between doses at a rate of 7.5–30 mg/min, (6 mL injection, 4 min wait, 6 mL injection, 5 min wait, final 5 mL administered), while closely observing the patient's vital functions and maintaining verbal contact to detect toxic manifestations of unintentional intravascular or intrathecal injection. Careful aspiration before and during injection is recommended to prevent intravascular injection and if toxic symptoms occur, the injection should be stopped immediately.

Parameters and recordings:

-***Sensory block*** will be assessed bilaterally at midclavicular line by pinprick test using blunt 25-gauge needle, starting from time of injection considering zero then every 5 minutes till 30 min then every 15 min till discharge from PACU and the followings will be recorded:

1-Level of maximum sensory block, (Highest sensory level was checked until sensory level was same for 4 consecutive readings).

2-Time of sensory block which is the time interval from epidural injection till the time sensory level reaches T10.

3-Time of maximum sensory block which is the time interval from epidural injection till the time of achieving maximum sensory level.

4-Time to two segment regression which is the time interval from epidural injection till time the sensory level regresses two levels to T12.

5-Duration of sensory block which is the time interval from epidural injection till sensory level regresses to S2.

6-Duration of effective analgesia (First feeling of pain) which is the time interval from onset of sensory block to when VAS score 4. At this time, patients were given rescue analgesic Injection in the form of ketorolac 30mg IM.

Readiness to surgery is defined as complete loss of pinprick sensation at T10.

-***Motor block*** will be assessed through measuring the following:

1-The degree of motor block: is determined according to the four-point modified Bromage scale by asking the patient to flex the hip, knee and ankle joints [0: patient able to move hip, knee and ankle; 1: unable to flex the hip; 2: unable to flex the hip and knee; 3: unable to flex the hip, knee and ankle] at the same interval as sensory blockade.

2-The onset of motor block: which is the time interval from epidural injection to Bromage score of 1.

3-The duration of motor block: is defined as time interval from epidural injection till the Bromage score returns to zero.

*All time were calculated considering the time of epidural injection as time zero.

-Visual analogue scale (VAS, 0 mm = no pain, 100 mm = worst imaginable pain) will be used to measure duration of complete (VAS = 0) and effective (VAS≤ 40/100 mm) analgesia at 20-min intervals.

Rescue analgesia is given in the form of ketorolac 30mg IM if VAS > 40 or on patient request when the patient complain of pain at the surgical site during surgery and the patient was excluded from data analysis.

-Grading of sedation is evaluated by a five-point scale (a-alert and fully awake, b-arousable to verbal command, c-arousable with gentle tactile stimulation, d-arousable with vigorous shaking and e-unarousable). Sedation scores are recorded just before the initiation of surgery and thereafter every 20 minutes during the surgical procedure.

-Cardio-respiratory parameters will be monitored continuously and recorded every 5 min until 30 min and at 10 min interval, thereafter up to 60 min and then at 15 min interval for next hour and finally at 30 min in the third hour. Hypotension (defined as systolic arterial pressure falling more than 20% from the base line) will be treated with i.v. ephedrine 3–6 mg in repeated bolus doses and IV fluid loading till blood pressure returns to its base line values, bradycardia (defined as heart rate <60 beats/min) will be treated with 0.5 mg atropine i.v. in repeated bolus doses, respiratory depression (defined as respiratory rate < 10 BPM) and oxygen desaturation (defined as SpO2 <92%). Intravenous fluids are given as per body weight and operative loss requirement.

-Adverse events during the surgical procedure, like anxiety, nausea, vomiting, pruritis, shivering, etc. will be recorded. Metoclopramide (10 mg IV) was administered for nausea (a feeling of sickness in the stomach characterized by an urge to vomit). Vomiting (to eject part or all of the contents of the stomach through the mouth, usually in a series of involuntary spasm movements) was treated with ondansetron 4 mg slow IV or IM, i.v. Pethidine 25 mg will be given to treat Shivering.

The patients were taken to the recovery room at the end of the operation and were monitored for 60 min. Following stable hemodynamic findings (basal systolic and diastolic blood pressures, HR), the patients were sent to the clinical wards.

Data Management and Statistical Analysis:

Continuous quantitative normally distributed data expressed as means and standard deviations (SD).

Quantitative discrete data expressed as median and range.

Qualitative nominal data e.g. incidence of complications expressed as frequency or percentage.

Patients' characteristics were compared using one-way analysis of variance.

For hemodynamic changes within the groups, repeated measures ANOVA were performed.

when ANOVA was found significant Tukey's post hoc test was used for comparing 2 groups.

Block characteristics were compared using Kruskal-Wallis and two-tailed Mann-Whitney U tests.

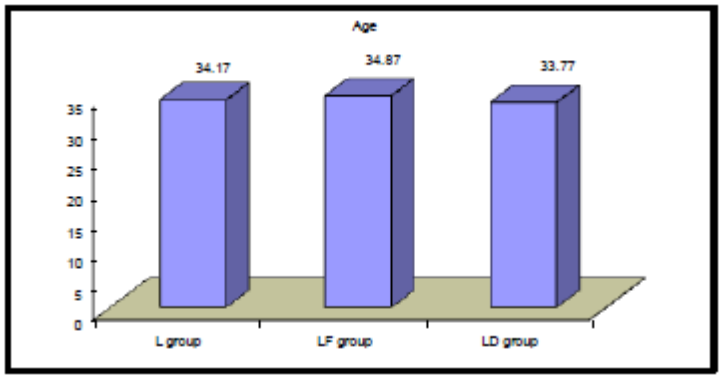
Incidences of adverse effects were analyzed using Fisher's-exact tests.

P – Value < 0.05 considered statistically significant.

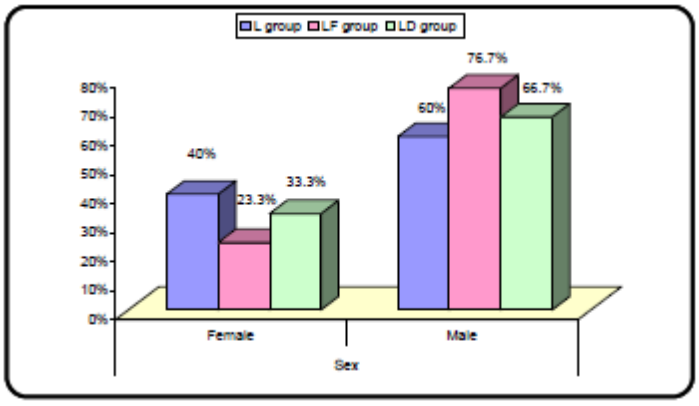
P – Value < 0.01 was considered statistically highly significant.

Results

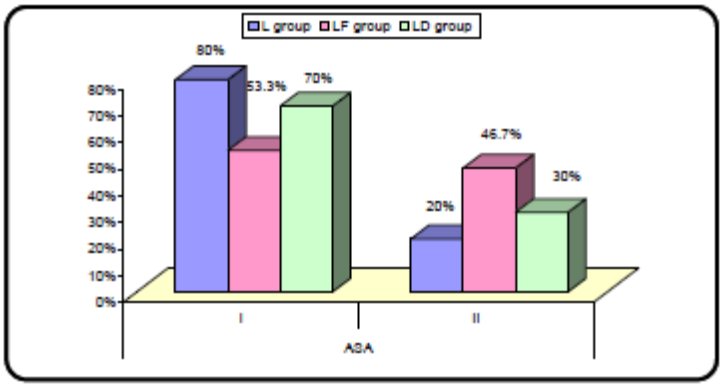
In our study, Sex and ASA are presented as percentage and other data are presented as mean ± standard deviation. The demographic profiles of the patients in the three groups were comparable as regards to age, sex, height, body weight, the ASA Physical status of patients and duration of surgery (Fig.1), (Fig.2), (Fig.3)



(Figure1): Age (year) distribution in the three studied groups.

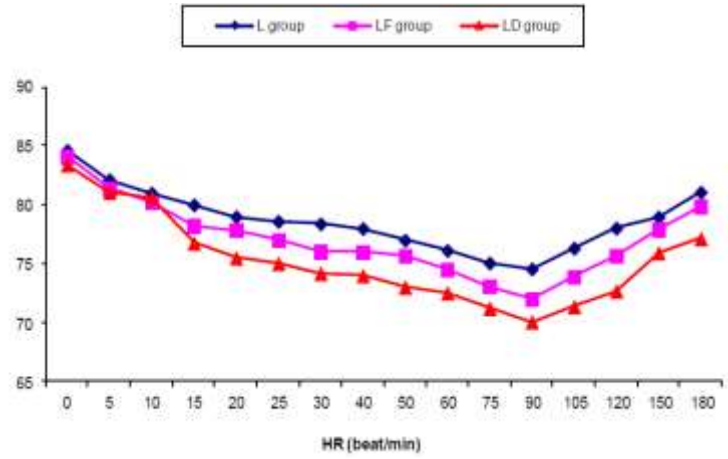


(Figure2): Gender distribution in the three studied groups.



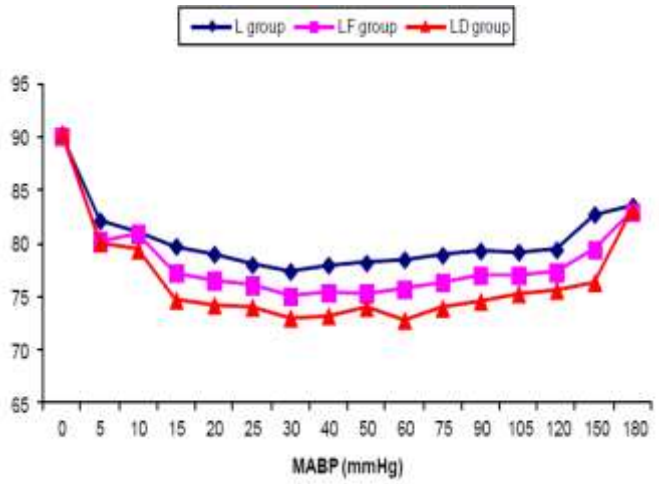
(Figure 3): ASA physical status of the patients in the three studied groups.

There was statistically significant difference in heart rate between group (L) and group (LD) at 25 minutes ($P < 0.05$) and highly significant difference between both groups (L) and (LD) at the rest of time intervals ($P < 0.01$).(***Figure 4)***



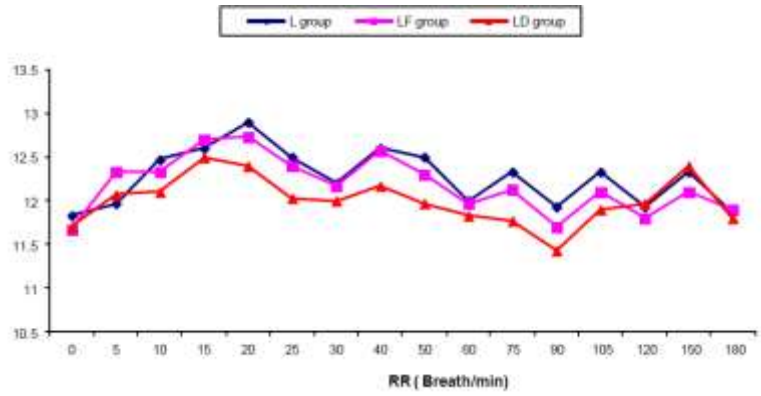
(Figure 4): Heart rate changes in the three studied groups

There was no statistically significant difference in the mean arterial blood pressure between the three studied groups in the first 15 minutes ($P>0.05$), then there was statistically highly significant difference in the MAP between group (L) and group (LD) ($P < 0.01$). **(Fig 5)**



(Figure 5): Mean arterial blood pressure changes in the three studied groups.

Respiratory rate remained stable throughout the operation in the three groups with no statistical difference between the three groups was recorded as shown in (fig 6)



(Figure 6): Respiratory rate (RR) (breathe \min) changes in the studied groups

There was statistically highly significant difference in onset of sensory block, time to achieve peak sensory level, two segment regression time and duration of sensory block among the three groups ($p < 0.01$). Onset of sensory block and time to achieve peak sensory level were early in group (LF) and group (LD) as compared to group (L) ($p<0.01$). The peak sensory level in group (LD) was T5 reached at 18.13 ± 2.80 minutes which is higher and earlier than that in group (LF) T7 at 21.50 ± 2.60 minutes and that in group (L) T8 at 24.43 ± 2.05 minutes. Two segment regression time and duration of sensory block were prolonged in group (LF) and (LD) as compared to group (L), the difference being statistically highly significant ($p<0.01$).

(Fig. 7) (Fig.8)

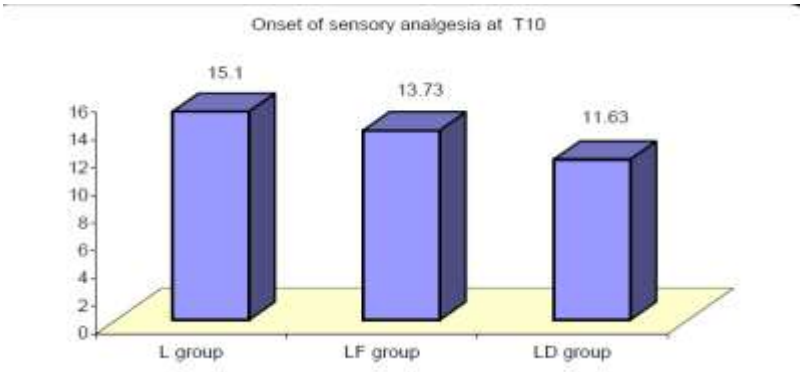


Figure 7): Onset of sensory analgesia at T10.

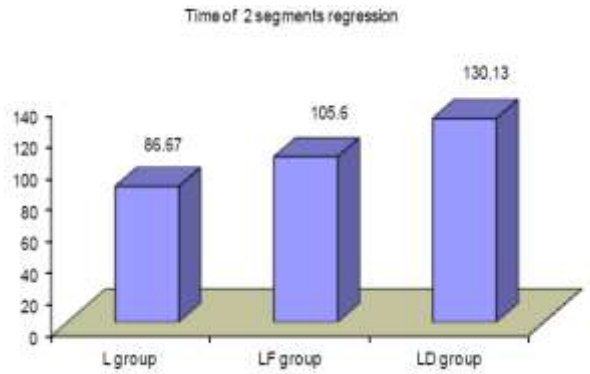
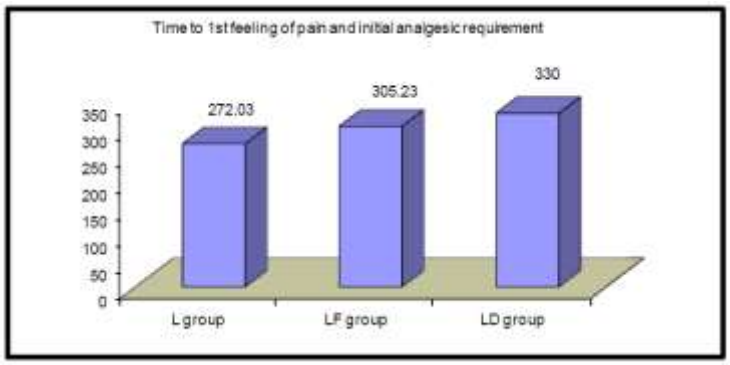
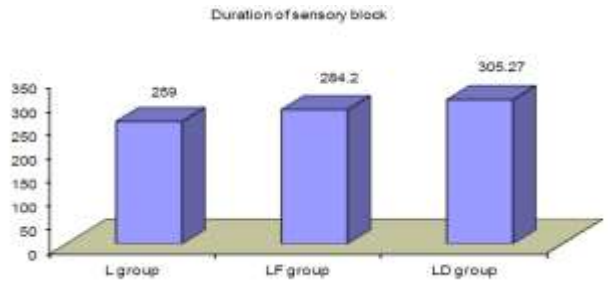


Figure 8): Time of 2 segments regression.

The mean duration of effective analgesia was 272.03 ± 18.36 min in group (L), 305.23 ± 16.13min in group (LF) and 330.00 ± 18.61 min in group (LD). Duration of effective analgesia was longer in group (LF) as compared to group (L) which was statistically highly significant (<0.01), while comparing group (L) and group (LD) the duration of effective analgesia was longer in group (LD) as compared to group (L) which was statistically highly significant (p <0.01), while comparing group (LF) and group (LD) the duration of effective analgesia was longer in group (LD) as compared to group (LF) which was statistically highly significant (p <0.01). ***(Figure 9) (Figure 10)***

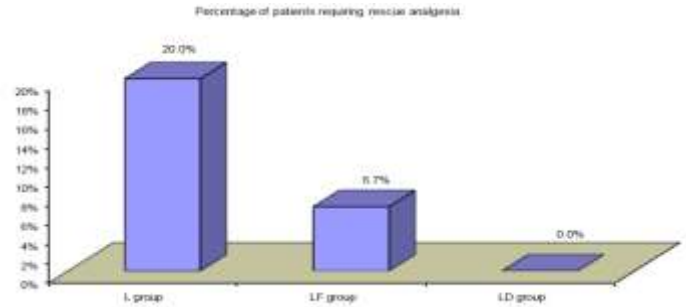


(Figure 9): Time to first feeling of pain and initial analgesic requirement.



(Figure 10): Duration of sensory block.

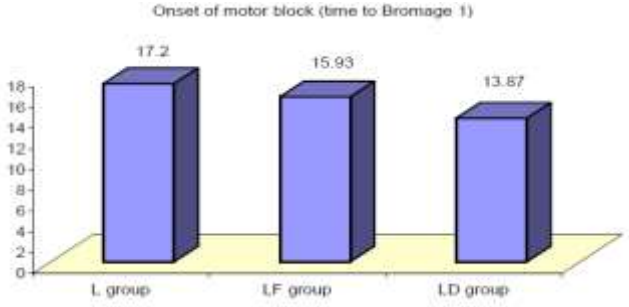
(fig.11) showed that the difference among the three groups was statistically significant ($p<0.05$). The Number & % of patients requiring rescue analgesia were more in group (L)as compared to group (LF) and group (LD), which was statistically significant ($p<0.05$).



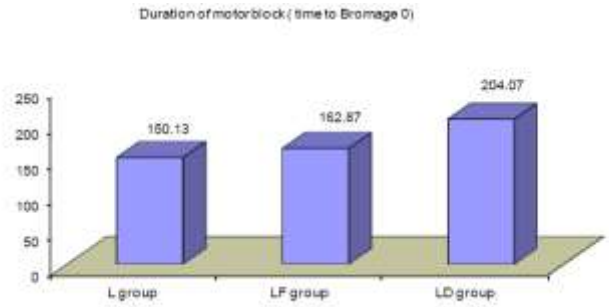
(Figure 11): % of patients requiring rescue analgesia.

In motor block there was statistically highly significant difference in onset of motor block and duration motor block ($p<0.01$). Onset of motor block was significantly early in group (LF) and group (LD) as compare to group group (L) ($p<0.01$). Duration of motor block was prolonged in group (LF) and group (LD) as compare to group (L) which was statistically highly significant ($p<0.01$) as shown in ***(fig.12) (fig.13)***

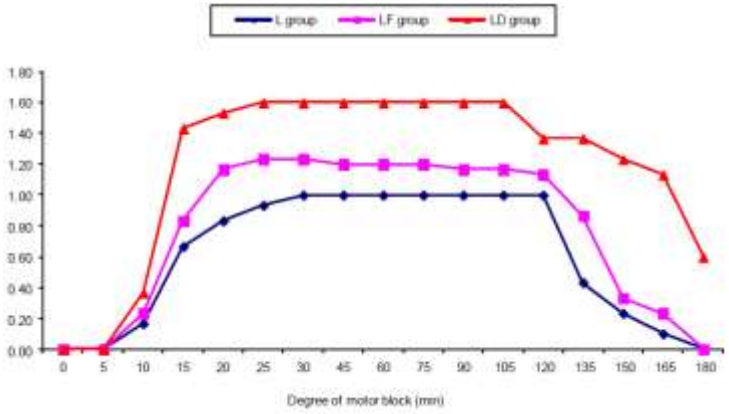
Regarding the degree of motor block, there was statistically significant difference among the three studied groups ($P<0.01$) as shown in ***(fig.14)***.



(Figure 12): Onset of motor block.

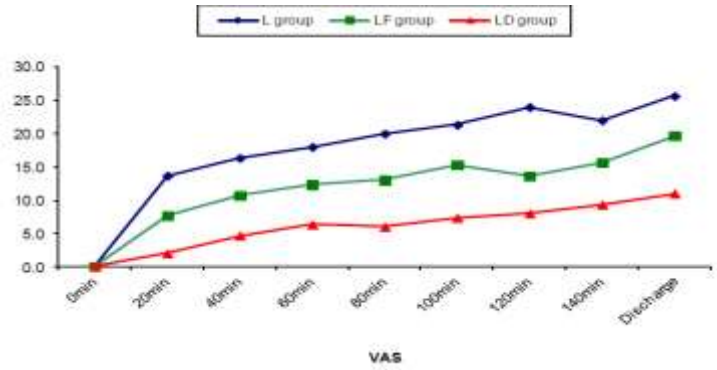


(Figure 13): Duration of motor block.



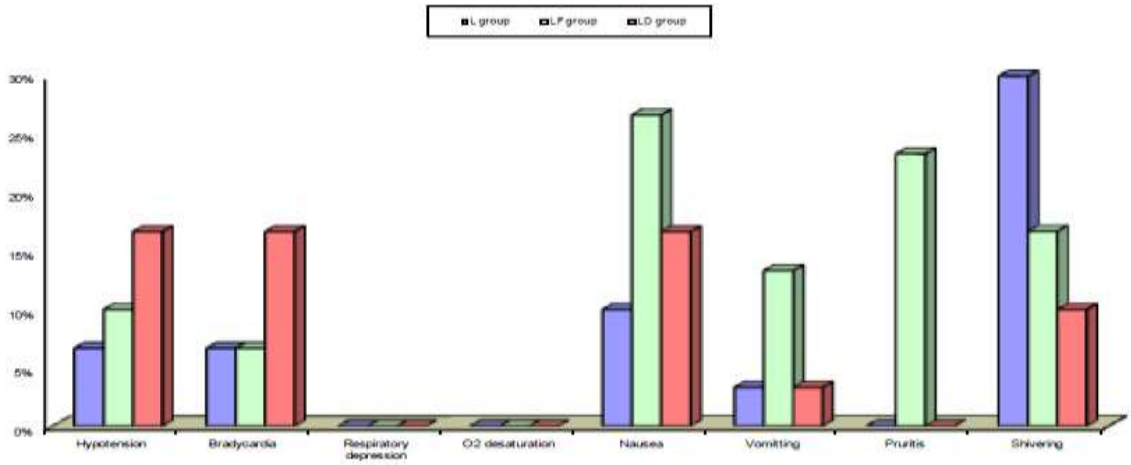
(Figure 14): Degree of motor block.

In our study mean VAS scores were significantly lower in group (LD) compared to group (L) and group (LF) which is statistically highly significant (P<0.01). ***(Fig.15)***



(Figure 15): The Visual Analogue Score.

(Fig.16) shows the comparative incidence of various side effects in the three groups which were observed in the intra-op and post-op period. The incidence of pruritis was significantly higher in (LF) group and it was statistically highly significant on comparison (P < 0.01). The incidence of other side effects like hypotension, bradycardia, nausea, vomiting and shivering, were comparable in the three groups and statistically non-significant. We did not observe the respiratory depression or O2 desaturation in any patient from any group.



(Figure 16): The adverse effects.

Discussion

This study was designed to compare in prospective double blinded, randomly controlled method the analgesic, sedative action and side effects of dexmedetomidine and fentanyl when added to levobupivacaine for epidural anesthesia in patients undergoing arthroscopic knee surgeries.

No statistically significant difference was found among the three groups regard mean demographic feature such as age, sex and ASA type of the patient (p value 0.874, 0.380, 0.083 respectively). Also, operation duration was comparable among the three groups (p value 0.925).

In our study levobupivacaine-dexmedetomidine combination produced earlier onset of epidural block, prolonged duration of sensory block and more sedation in comparison to levobupivacaine-fentanyl combine which was statistically significant.

Addition of dexmedetomidine to levobupivacaine as an adjuvant resulted in an earlier onset (11.63 ± 1.27 min) of sensory analgesia at T10 as compared to the addition of fentanyl (13.73 ± 2.15 min) and (15.10 ± 2.20 min) in levobupivacaine without adjuvant.

Dexmedetomidine not only provided a higher dermatomal spread but also helped in achieving the maximum sensory anesthetic level in a shorter period T5 (18.13 ± 2.80 min) compared to fentanyl T7 (21.50 ± 2.60 min) and T8 (24.43 ± 2.05min) in Levobupivacaine alone.

Dexmedetomidine provided prolonged post-operative analgesia as compared to fentanyl. The evidence was very much visible in the prolonged time to two segmental dermatomal regression (130.13 ± 6.02min) in (LD) group as compared to (105.60 ± 7.30) min in (LF) group and (86.67 ± 9.91 min) in (L) group, and prolonged duration of sensory block which was (305.27 ± 29.33 min) in (LD) group, (284.20 ± 28.94 min) in (LF) group and (259.00 ± 30.94 min) in (L) group, and prolonged duration of effective analgesia was (330.00 ± 18.61 min) in group (LD) as compared to group (LF) which was (305.23 ± 16.13 min) and (272.03 ± 18.36 min) in (L) group.

As a result, the number of patients requiring rescue analgesia was comparatively fewer (0

patients) in (LD) group, (2 patients) in (LF) group and (6 patients) in (L) group.

Disma *et al.;* in their study found that clonidine produced a local anesthetic sparing effect with a dose dependent decrease in ED50 of levobupivacaine for caudal anesthesia. In addition, there was a dose dependent prolongation of postoperative analgesia following lower abdominal surgery in children.

A dose of 2 μg/ kg of clonidine provides the optimum balance between improved analgesia and minimal side effects. **(6)**

In agreement of our study, Milligan *et al.;* opoined that, in patients undergoing total hip replacement, the addition of the alpha 2-adrenergic agonist clonidine to epidural infusions of levobupivacaine significantly improved postoperative analgesia. **(7)**

Ahmed Sobhy Basuni *et al.;* used dexmedetomidine as supplement to low dose levobupivacaine in spinal anesthesia for knee arthroscopy. They opoined that dexmedetomidine was a good alternative to fentanyl for supplementation of low dose levobupivacaine in spinal anesthesia for knee arthroscopy. Dexmedetomidine shortened time to surgery, time to highest sensory level, and time to highest Bromage score. The duration of sensory block was significantly longer in dexmedetomidine group. The pain free period was more prolonged, and the visual analog scale for pain was lower in dexmedetomidine group. **(8)**

Regarding the motor block in the current study, Addition of dexmedetomidine to levobupivacaine resulted in an earlier onset (13.87 ± 2.10 min) of motor block as compared to the addition of fentanyl (15.93 ± 2.00 min) and (17.20 ± 2.25 min) in levobupivacaine without adjuvant with statistically highly significant differences among the three groups ($P<0.01$) ,prolonged duration of motor block which was (150.13 ± 16.95 min) in group L and (162.87 ± 16.61min) in group (LF) and (204.07 ± 18.17 min)in (LD) group, with statistically highly significant differences among the three groups ($P<0.01$). In the current study, when the degrees of motor block over time were compared, a statistically highly significant difference was found among the three groups (p value <0.01).

In agreement of our finding, Zeng XZ *et al.;* in their study found that low dose epidural dexmedetomidine improved thoracic epidural anesthesia for nephrectomy. Sensory and motor blockade duration was longer in the dexmedetomidine group than in the control group. The muscle relaxation score was significantly higher in the dexmedetomidine group compared with the control group. Pain score and analgesic requirement was lower in dexmedetomidine group. **(9)**

There was statistical difference in hemodynamic parameters in the three groups. There was statistically significant difference in heart rate between group (L) and group (LD) at 25 minutes ($P < 0.05$) and highly significant difference between both groups (L) and (LD) at the rest of time intervals ($P < 0.01$). There was a slight increase in mean arterial blood pressure during epidural injection and slight decrease over 15 minutes after injection; There was no statistically significant difference in the mean arterial blood pressure between the three studied groups in the first 15 minutes ($P>0.05$), then there was statistically highly significant difference in the MAP between group (L) and group (LD) ($P < 0.01$). The heart rate and blood pressure were significantly lower in the (LD) group over time but without clinical consequence.

Wallet *et al.;* in their study found that the addition of clonidine to epidural levobupivacaine and sufentanil for patient controlled epidural analgesia in

labour improved analgesia, reduced the supplementation rate and reduced pruritus. Blood pressure was significantly lower in the clonidine group over time but without clinical consequence. **(10)**

Akin *et al.;* in their study found that caudal clonidine prolonged the duration of analgesia produced by caudal levobupivacaine without causing significant side effects and this was because of a spinal mode of action. **(11)**

Mahran *et al.;* found that both clonidine and fentanyl can be used as effective additive to epidural levobupivacaine for postoperative analgesia after radical cystectomy with no significant difference between them in vital signs, analgesic, sedative effects and safety profile. **(12)**

Dexmedetomidine is a popular sedative agent nowadays and similar findings were observed in our study as well. Mean sedation scores were significantly higher in (LD) group compared to (LF) group as at 20 minutes after epidural injection 33% of patients in group (LD) had a sedation score of C as compared 3.3%of patients in group (LF) had a sedation score of C ($P < 0.001$) which was a highly significant statistical entity ($P < 0.001$)

Bajwa *et al.;* showed in their study that dexmedetomidine was a better adjuvant than clonidine in epidural ropivacaine anesthesia for patient comfort, superior sedative and anxiolytic properties, intraoperative and postoperative analgesia. **(13)**

Wu H-H *et al.;* in a retrospective study opined that neuroaxial dexmedetomidine was a favorable adjuvant to local anesthetics which provides better and longer analgesia. Neuroaxial dexmedetomidine was associated with good sedation scores and lower analgesic requirements and stable into-operative hemodynamics. **(14)**

The results of the current study confirmed that there were comparable rates of adverse events in the form of hypotension with higher incidence in (LD) group (16.67%) than (LF) group (10%) and (6.67%) in (L) group and was treated with i.v. ephedrine 3–6 mg in repeated bolus doses and IV fluid loading till blood pressure returns to its base line values, bradycardia with incidence of (6.67%), (6.67%), (16.67%) in (L), (LF), (LD) group respectively and was treated with with 0.5 mg atropine i.v. in repeated bolus doses.

Nausea was reported in three patients of group (L), in eight patients in group (LF) and in five patients in group (LD), and was treated with Metoclopramide (10 mg IV), vomiting occur in one patient in both (L) and (LD) groups and in four patients in (LF) group, and was treated with ondansetron 4 mg slow IV or IM. Shivering occur in 9 patients in group (L), 5 patients in group (LF) and 3 patients in group (LD) and was treated with i.v. Pethidine 25 mg, no respiratory depression nor O2 desaturation occurred in any patient. The incidence of pruritis was significantly higher in (LF) group (23.33%) and it was statistically highly significant on comparison ($P < 0.01$).

A 0.5-1 ug/kg dose of dexmedetomidine by epidural route reduces the onset time of the block, increases duration of analgesic effect, improves the analgesic quality and causes sedation without respiratory depression, although there are studies used a 2 ug/kg dose. **(15)**

The use of dexmedetomidine via epidural in humans occurred in 1997, a study in which the dexmedetomidine in a dose of 2μg/kg was used associated with Lidocaine 1.5 % by total 225 mg dose in patients anesthetized with isoflurane and submitted to hysterectomy. The authors found that the time of postoperative analgesia was prolonged by dexmedetomidine compared with lidocaine epidural administration only. **(16)**

Also, post-operative analgesia occurred with addition of dexmedetomidine in fixed dose of 100 μg, when administered in association with 0.5 % bupivacaine in patients subjected to hysterectomy under epidural anesthesia. **(17)**

CONCLUSION:

Use of dexmedetomidine as an adjuvant to levobupivacaine was a good alternative to other adjuvants like fentanyl in epidural anesthesia. Both fentanyl and dexmedetomidine provided adequate sensory, motor block and their side effects were well tolerated by the patients but dexmedetomidine had an edge over fentanyl as adjuvant when used with levobupivacaine in epidural anesthesia.

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