

Dexmedetomidine Added to Bupivacaine Versus Bupivacaine Alone in Ultrasound-Guided Erector Spinae Block in Spine Surgeries for Post Operative Pain Management: A Randomized Controlled Study

MANAR M. ELKHOLY, M.D.*; AHMED KARIM MOHAMMED, M.D.*; ALAA A. NYAZI, M.D.* and ASMAA A. YOUSSEF MOHAMED, M.Sc.**

The Department of Anesthesiology, ICU & Pain Management, Faculty of Medicine, Cairo University and Misr University for Science & Technology***

Abstract

Background: During spine surgery, mechanical and thermal trauma can cause muscle ischemia and damage to nerves innervating the paraspinal muscles. Therefore, it is often characterized by severe and diffuse pain in the postoperative period, so adequate postoperative analgesia is essential to allow early mobilization, reducing the incidence of postoperative respiratory complications, and decrease the risk of chronic pain syndrome.

Aim of Study: To investigate the effectiveness of a mixture of dexmedetomidine and bupivacaine versus bupivacaine alone for ESB postoperative analgesia in spine surgery.

Patients and Methods: The study was conducted at Neurosurgery operation Theater at Souad Kafafi University Hospital-Misr University of science and Technology (MUST). 70 Patients aged above 21 years, scheduled for spine surgery, 35 patients in each group equally.

Results: Intra operative Fentanyl Consumption ($\mu\text{g}/\text{kg}$) there was significantly lower in Bupivacaine & Dexmedetomidine group ($p < 0.003$). Postoperative pain (VAS-10) among both study groups there weren't significantly lower in Bupivacaine & Dexmedetomidine group throughout follow-up time points, but the differences were statistically significant at hour 8, 12 and 24. Post-operative morphine consumption there was significantly lower in Bupivacaine & Dexmedetomidine group. Time to first postoperative dose was significantly longer in Bupivacaine & Dexmedetomidine group. Post-operative complications related to morphine consumption (nausea, vomiting and pruritus) were less frequent in Bupivacaine & Dexmedetomidine group, but the differences were statistically significant only in nausea.

Conclusion: The addition of dexmedetomidine to bupivacaine in US-guided Erector Spinae block during spine surgery reduce both intra operative fentanyl consumption and post operative morphine consumption, significantly prolong time to first postoperative morphine dose and reduces post-operative Nausea, vomiting (PONV) and pruritis owing to

Correspondence to: Dr. Asmaa Ahmed Youssef Mohamed, The Department of Anesthesiology, ICU & Pain Management, Misr University for Science & Technology

lowering the total opioid consumption compared with bupivacaine alone.

Key Words: *Post-operative nausea – Vomiting – Erector spinae Block.*

Introduction

POSTOPERATIVE pain management in spine surgery usually includes administration of extensive amounts of opioids. Which can cause many side-effects, such as respiratory depression, sedation, nausea, vomiting, and constipation. Which can lead to a longer hospital stay and a worse patient experience [1,2]. However, with opioids, pain is not always sufficiently managed. Inadequate pain control increases cardiac and respiratory complications, delays mobilization, increases the length of hospital stay and may increase the risk of developing a chronic pain syndrome [3]. These complications indicate the need for increasing role for novel regional anesthesia techniques.

The nature of the motor and sensory anatomy and function of the spinal cord minimizes the role of spinal and epidural analgesia as suitable pain treatments. Novel interfascial plane blocks, such as the erector spinae plane (ESP) block [4], generate regional analgesia without interference of spinal cord function and are therefore suitable for spinal surgery pain management [5].

Ultrasound Guided Erector Spinae Plane Block consist of a recent Block that targeting the ventral rami, dorsal rami, and rami Communicants of spinal nerves [6]. It has been known that this block provides good post operative analgesia after Breast, visceral abdominal, Bariatric and thoracic surgery. it also used after thoracic spine surgery [7]. For

breast and thoracic surgery [8-10] it is performed at the T4-T5 level, and for abdominal surgery at T7. We hypothesized that if the block is performed at the level of T10 it could provide effective analgesia after lumbar spine surgery. This is possible because the erector spinae fascia extends from the nuchal fascia cranially.

To the sacrum caudally ventral rami. It may spread to the intervertebral foramina to the origin of spinal nerves [11].

Regarding ESP block Vs paravertebral block, ESP has a very low risk of complications, as Sono-anatomy is easy recognized and transverse process acts as an anatomical barrier, it also avoids needle insertion into the pleura or vessels, thus preventing a pneumothorax or hematoma. Moreover, the needle is relatively far from the vertebral canal, which means the risk of spinal cord injury is very low

[12].

Dexmedetomidine is highly specific and highly selective α_2 -adrenoceptive agonist with a high ratio of α_2/α_1 activity (1620:1) compared with clonidine (220:1), thus this ensures that its action is selective to the CNS without the unwanted effect on the CVS that would result from α_1 activation

[13].

Adding Dexmedetomidine to Bupivacaine in ESP has a highly effective sedative and analgesic effect [14]. It has been found that, in many experimental and clinical regional block practices, the addition of dexmedetomidine (0.5 μ g/kg) to the local anesthetic reduces tissue and nerve damage, increases duration of sensory and motor block, and reduces postoperative pain. For example, Transversus abdominis plane (TAP) block done by ropivacaine combined with dexmedetomidine [15].

Aim of the work:

The aim of this study is to investigate the effectiveness of a mixture of dexmedetomidine and bupivacaine versus bupivacaine alone for ESB for postoperative analgesia in spine surgery.

Patients and Methods

Ethical considerations: After the approval of research ethical committee. Informed written consent was obtained from study participants or their legally authorized representative.

Study design: Double blinded randomized controlled trial.

Study setting and location: The study was conducted at Neurosurgery operation Theater at Souad

Kafafi University Hospital-Misr University of science and Technology (MUST) From August 2022 – February 2023.

Study population: Patients aged above 21 years, scheduled for spine surgery.

Both Groups received ultrasound Guided Erector Spinae Block after Induction of general Anesthesia with the following difference: Group A: was done with Bupivacaine alone. Group B: Was done with Bupivacaine and dexmedetomidine

Eligibility criteria:

Inclusion criteria: Patient's age >21, ability to sign the consent, patients scheduled for spine surgery, ASA classification I, II: ASA I: Normal Healthy Patient, ASA II: Patient with mild systemic controlled disease; Current smoker, social alcohol drinker, pregnancy, obesity (30<BMI<40), well-controlled DM/HTN, mild lung disease.

Exclusion criteria: Patient refusal, coagulation disorders that affect the blood's clotting activities e.g.: Hemophilia, skin lesions or infection at site of proposed needle, known allergy to local anesthetics or dexmedetomidine, patients suffering from mental disease as cannot Assess the Visual Analogue Scale (VAS) that measures pain intensity as, mental retardation & psychosis. ASA III, IV: ASA III: A patient with severe systemic disease; Poorly controlled DM or HTN, Chronic Obstructive Lung Disease (COPD), morbid obesity (BMI 40), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of ejection fraction, End Stage Renal Disease (ESRD) undergoing regularly scheduled dialysis, ASA IV: A patient with severe systemic disease that is a constant threat to life; Recent (<3 months) myocardial infarction (MI), Cerebrovascular accident (CVA), Transient Ischemic Attack (TIA) or coronary artery disease (CAD/stents), ongoing cardiac ischemia or severe valve dysfunction, severe reduction of ejection fraction, shock, sepsis, Disseminated Intravascular Coagulation (DIC), acute respiratory distress syndrome (ARDS) or ESRD not undergoing regularly scheduled dialysis.

Study procedures:

Randomization: Patients was randomly allocated by a computer-generated table into one of the study groups; the randomization sequence was concealed in sealed opaque envelopes.

Study protocol:

All Patients have had a pre-operative assessment visit, which included history taking, complete

physical examination and review of all the results of the routine investigations. On Arrival to the preparation room, they received the following premedication via intravenous (IV) route: Midazolam 0.03mg/kg, Metoclopramide 10mg & Ranitidine 50mg. Upon Arrival to the operating room, the standard Monitoring was applied which include Pulse Oximeter, Noninvasive Blood Pressure & Six-lead electrocardiogram (ECG). The General Anesthesia was induced using: Propofol 1-2mg/kg, Fentanyl 1-2µg/kg and Atracurium 0.5mg/kg. it will be maintained using Sevoflurane 2 MAC, Incremental doses of Atracurium. Fentanyl incremental doses (0.5µg/kg) was given when the mean blood pressure, heart rate or both increased by more than 20% from the baseline (signs of inadequate analgesia). The fluid replacement managed properly according to each patient body weight, fasting hours, blood loss, and duration of the operation.

So, after the patient has been put in the prone position, we did the ESBP with the following technique: Under complete Aseptic technique which was done by wearing sterile gown and sterile gloves, then the skin was sterilized using chlorhexidine. The block performed at level of Thoracic vertebrae T10 under ultrasonography [Mindray, Model: DC-N2] and marked on the skin. After placing a 5-12 MHz linear probe parallel to the vertebral axis the probe was moved from the lateral side to medial side transversely to identify any change in shape that transited the rib and transverse process (TP). When the round shadow of the rib was shifted into the rectangular shape of the TP, an echogenic nerve block needle 8-cm 22-G block needle (Contiplex; B Braun, Melsungen, Germany) was inserted toward the trapezius and Erector Spinae and the TP of T10 using the plane technique in a cephalad-to-caudal direction. When the needle was in contact with the TP, we confirmed that this fascial plane is well separated by injecting 2ml of saline. Then, we injected our medications according to the group: Group A patients:

A total of 30mL bupivacaine 0.25% was injected.

Group B patients: A total of 30mL bupivacaine 0.25% +2ml Dexmedetomidine (0.5µg/kg) was injected.

For both groups, after finishing the Block, the skin incision was delayed 15-20 minutes to ensure its spread and efficacy. Postoperatively, all patients received IV paracetamol 1gm every 8 hours, (Ketorolac) IM every 8 hours. Patients of both groups will have their pain severity evaluated using

Visual Analogue Scale (VAS) Numeric pain distress scale graded from 0 to 10 at 1st hr, 4, 8, 12, and 24 hours postoperatively.

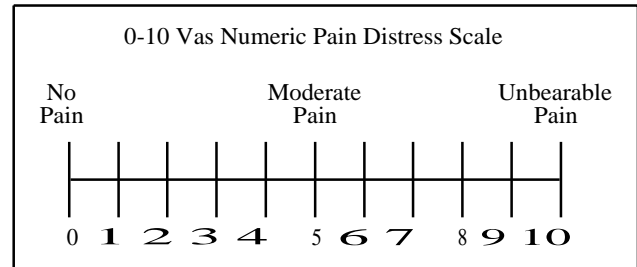


Fig. (1): Vas Numeric pain distress scale.

Supplementary analgesia was given when VAS 4 in the form of morphine 0.05mg/kg with maximum dose morphine 0.4mg/kg within 24 hrs. The time to rescue analgesia will be recorded and Total morphine consumption in 24 hrs. will be also recorded. Morphine replaced with another form of analgesia if complications has recorded such as: Nausea, vomiting and Rash.

To ensure double blinded study, one investigator was responsible for the preparation of the drugs administered which was coded according to computer-based system: Giving numbers and litters. Another investigator was responsible for giving the ESP Block. A third investigator observed and collected the data; hemodynamics, VAS score, etc...

Data interpretation was done after completion of the study and the results was obtained.

Study outcomes:

Primary outcome: Comparing postoperative total morphine consumption over 24 hours between the two groups.

Secondary outcome(s): Complications (Hematoma formation, Intravascular injection, Pruritus, nausea, vomiting). Measuring Hemodynamics (Blood Pressure, Heart rate) at: T0 (Just Before induction of general Anesthesia, T1 (Just Before Starting the Block) & T2 (30minutes after doing the block). Intra operative Fentanyl Consumption.

Statistical methods:

The collected data were coded, tabulated, and statistically analyzed using IBM SPSS statistics (Statistical Package for Social Sciences) software version 28.0, IBM Corp., Chicago, USA, 2021. Quantitative data tested for normality using Shapiro-Wilk test, then described as mean ± SD (standard deviation) as well as minimum and maximum of the range, after then compared using independent

t-test. Qualitative data described as number and percentage and compared using Chi square test as well as Fisher's Exact test for variables with small, expected number. Bonferoni test used for post hoc comparisons. The level of significance was taken at *p*-value 0.050 was significant, otherwise was non-significant.

Results

Table (1) showed that: No statistical significant differences between the study groups regarding demographic characteristics; age, sex, weight and ASA.

Table (2) showed that: No statistical significant differences between the study groups regarding operation duration and anesthesia duration.

Table (3) showed that: No statistical significant differences between the study groups regarding T0 and T1 heart rate. T2 heart rate was significantly lower in Bupivacaine & Dexmedetomidine group.

Table (4) showed that: No statistical significant differences between the study groups regarding T0 and T1 Mean blood pressure. T2 Mean blood

pressure was significantly lower in Bupivacaine & Dexmedetomidine group.

Table (5) showed that: Intra operative Fentanyl Consumption was significantly lower in Bupivacaine & Dexmedetomidine group.

Table (6) showed that: Postoperative pain (VAS-10) was non-significantly lower in Bupivacaine & Dexmedetomidine group throughout follow-up time points, but the differences were statistically significant at hour-8, 12 and 24.

Table (7) showed that: Total 24-hours morphine dose was significantly lower in Bupivacaine& Dexmedetomidine group. Time to first postoperative dose was significantly longer in Bupivacaine& Dexmedetomidine group.

Fig. (1) showed that: Rate of need to first postoperative morphine dose was significantly slower in Bupivacaine & Dexmedetomidine group.

Table (8) showed that: Post-operative nausea, vomiting and pruritus were less frequent in Bupivacaine & Dexmedetomidine group, but the differences were statistically significant only in nausea.

Table (1): Demographic characteristics among the study groups.

Variables	Measures	Bupivacaine & Dexmedetomidine (Total=35)	Bupivacaine (Total=35)	<i>p</i> -value
Age (years)	Mean ± SD	41.9±4.3	42.5±5.3	^0.655
	Range	35.0-52.0	33.0-52.0	
Sex (n, %)	Male	24 (68.6%)	22 (62.9%)	#0.614
	Female	11 (31.4%)	13 (37.1%)	
Weight (kg)	Mean ± SD	81.7±13.4	83.9±11.6	^0.473
	Range	57.0-114.5	62.5-111.0	
ASA (n, %)	I	22 (62.9%)	20 (57.1%)	#0.626
	II	13 (37.1%)	15 (42.9%)	

^Independent *t*-test. #Chi square test.

Table (2): Operation characteristics among the study groups.

Variables	Measures	Bupivacaine & Dexmedetomidine (Total=35)	Bupivacaine (Total=35)	<i>p</i> -value
Operation duration (minutes)	Mean ± SD	143.1±10.5	144.4±9.6	^0.594
	Range	122.0-167.0	125.0-165.0	
Anesthesia duration (minutes)	Mean ± SD	155.2±10.6	156.7±10.2	^0.544
	Range	136.0-179.0	134.0-178.0	

^Independent *t*-test.

Table (3): Heart rate (beat/minute) among the study groups.

Time	Measures	Bupivacaine & Dexmedetomidine (Total=35)	Bupivacaine (Total=35)	p-value	Relative effect	
					Measures	Values
T0	Mean ± SD	78.2±5.2	79.7±5.9	^0.279	Mean ± SE	-1.5±1.3
	Range	67.0-91.0	66.0-95.0		95% CI	-4.1-1.2
T1	Mean ± SD	73.9±5.3	75.1±5.9	^0.352	Mean ± SE	-1.3±1.3
	Range	62.0-86.0	63.0-90.0		95% CI	-3.9-1.4
T2	Mean ± SD	62.9±5.6	70.5±6.2	^<0.001 *	Mean ± SE	-7.6±1.4
	Range	50.0-75.0	58.0-86.0		95% CI	-10.4--4.8

^Independent t-test. *Significant.
 Relative effect: Effect in Bupivacaine & Dexmedetomidine group relative to Bupivacaine group.
 SE: Standard error. CI: Confidence interval.

Table (4): Mean blood pressure (mmHg) among the study groups.

Time	Measures	Bupivacaine & Dexmedetomidine (Total=35)	Bupivacaine (Total=35)	p-value	Relative effect	
					Measures	Values
T0	Mean ± SD	99.2±8.7	98.8±8.7	^0.848	Mean ± SE	0.4±2.1
	Range	77.0-112.0	82.0-117.9		95% CI	-3.8-4.6
T1	Mean ± SD	87.9±8.6	85.6±9.0	^0.271	Mean ± SE	2.3±2.1
	Range	67.0-100.0	66.0-107.0		95% CI	-1.9-6.6
T2	Mean ± SD	74.7±6.9	80.1±9.3	^0.008 *	Mean ± SE	-5.3±2.0
	Range	59.0-82.0	60.0-103.0		95% CI	-9.2--1.4

^Independent t-test. *Significant.
 Relative effect: Effect in Bupivacaine & Dexmedetomidine group relative to Bupivacaine group.
 SE: Standard error. CI: Confidence interval.

Table (5): Intra operative Fentanyl Consumption (µg/kg) among the study groups.

Measures	Bupivacaine & Dexmedetomidine (Total=35)	Bupivacaine (Total=35)	p-value	Relative effect	
				Measures	Values
Mean ± SD	1.7±0.8	2.5±1.3	^0.003 *	Mean ± SE	-0.8±0.3
Range	0.0-3.0	0.0-5.0		95% CI	-1.3--0.3

^Independent t-test. *Significant.
 Relative effect: Effect in Bupivacaine & Dexmedetomidine group relative to Bupivacaine group.
 SE: Standard error. CI: Confidence interval.

Table (6): Postoperative pain (VAS-10) among the study groups.

Time	Measures	Bupivacaine & Dexmedetomidine (Total=35)	Bupivacaine (Total=35)	p-value	Relative effect	
					Measures	Values
Hour-1	Mean ± SD	1.5±0.7	1.8±0.7	^0.134	Mean ± SE	-0.3±0.2
	Range	0.0-2.0	1.0-3.0		95% CI	-0.6-0.1
Hour-4	Mean ± SD	2.3±0.6	2.6±0.9	^0.077	Mean ± SE	-0.3±0.2
	Range	1.0-3.0	1.0-4.0		95% CI	-0.7-0.0
Hour-8	Mean ± SD	2.8±0.7	3.3±1.0	^0.013*	Mean ± SE	-0.5±0.2
	Range	2.0-4.0	2.0-6.0		95% CI	-0.9--0.1
Hour-12	Mean ± SD	4.1±0.7	5.2±1.2	^<0.001 *	Mean ± SE	-1.1±0.2
	Range	3.0-5.0	3.0-7.0		95% CI	-1.5--0.6
Hour-24	Mean ± SD	3.2±0.8	3.9±0.9	^<0.001 *	Mean ± SE	-0.8±0.2
	Range	2.0-4.0	3.0-5.0		95% CI	-1.2--0.4

^Independent t-test. *Significant.
 Relative effect: Effect in Bupivacaine & Dexmedetomidine group relative to Bupivacaine group.
 SE: Standard error. CI: Confidence interval.

Table (7): Post-operative morphine consumption among the study groups.

Measures	Bupivacaine & Dexmedetomidine (Total=35)	Bupivacaine (Total=35)	p-value	Relative effect	
				Measures	Values
Total 24-hours morphine dose (mg/kg)					
Mean ± SD	0.11±0.04	0.20±0.13	^<0.001 *	Mean ± SE	-0.10±0.02
Range	0.05-0.20	0.05-0.40		95% CI	-0.14--0.05
Time to first postoperative dose (hours)					
Mean ± SD	10.1±1.4	7.5±2.5	^<0.001 *	Mean ± SE	2.6±0.5
Range	8.0-12.0	4.0-12.0		95% CI	1.6-3.6

^Independent t-test. *Significant.
 Relative effect: Effect in Bupivacaine & Dexmedetomidine group relative to Bupivacaine group.
 SE: Standard error. CI: Confidence interval.

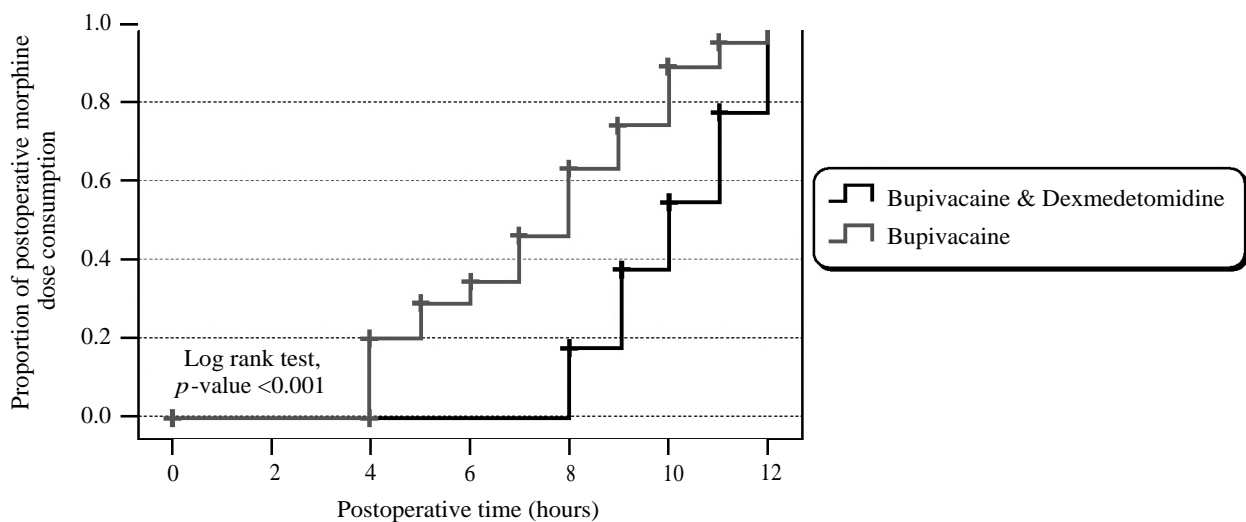


Fig. (2): Kaplan-Meier curve for rate of first postoperative morphine dose.

Table (8): Post-operative complications related to morphine consumption among the study groups.

Complications	Bupivacaine & Dexmedetomidine (Total=35)	Bupivacaine (Total=35)	p-value	Relative effect	
				Relative risk	95% CI
Nausea	2 (5.7%)	9 (25.7%)	#0.022*	0.22	0.05-0.96
Vomiting	1 (2.9%)	4 (11.4%)	§0.356	0.25	0.03-2.13
Pruritus	1 (2.9%)	2 (5.7%)	§0.999	0.50	0.05-5.27

#Chi square test. §Fisher's Exact test. *Significant. CI: Confidence interval.
 Relative effect: Effect in Bupivacaine & Dexmedetomidine group relative to Bupivacaine group.

Discussion

Lumbar spine surgeries are performed to relieve pain and provide functional improvement in patients with spinal canal stenosis, spine fracture and degenerative spine disease. During surgery, mechanical and thermal trauma can cause muscle ischemia and damage to nerves innervating the paraspinal muscles. Therefore, it is often characterized by severe and diffuse pain in postoperative period 16 So, adequate postoperative analgesia is essential

to allow early mobilization, reducing the incidence of postoperative respiratory complications and decrease the risk of chronic pain syndrome [17].

Patients undergoing spine surgeries require a multimodal postoperative pain management that provides high quality analgesia with minimal side effects. Until now, spine surgeries are performed by general anesthesia (GA). However, GA cannot provide adequate postoperative pain control plus routine use of parenteral opioids aggravate nausea,

emesis, impaired oxygenation, and depressed ventilation. Many studies were conducted to find a different analgesic modality as nerve blocks [17].

Paravertebral block became the gold standard techniques to achieve this goal, but due to its anatomical proximity to pleura, central neuraxial system and major vascular structure, so it is a challenging one and not every anesthesiologist is comfortable performing these procedures [18].

Erector spinae plane block was first described by Forero et al., [17] clinical experiences indicate that the optimal plane for injection in the ESP block is deep to the erector spinae muscle rather than superficial to it [17].

Erector Spinae used to manage thoracic neuropathic pain in a patient with metastatic disease of the ribs and rib fractures [19]. Since then, the block has been reported to have been used successfully in a multitude of procedures including thoracotomies, percutaneous nephrolithotomies, ventral hernia repairs, and even lumbar fusions [20,21] with success rates providing visceral and somatic analgesia.

Three theories have been proposed to clarify the prolonged analgesic effect of adding dexmedetomidine to perineural LA beside its central action after systemic absorption. The first one is vasoconstriction mediated by action of vascular α_2 adrenoceptor at injection site, which delays the absorption of LA and prolongs its efficacy [22,23]. Second, dexmedetomidine blocks hyperpolarization-activated cationic currents and reduces acute local anesthetic-induced perineural inflammation without causing nerve damage [24]. Finally, dexmedetomidine itself has analgesic effect, and peripheral α_2A -ARs are the mechanism of dexmedetomidine in the treatment of peripheral nerve block pain [25].

Dexmedetomidine when used as adjuvant to Bupivacaine in regional blocks prolongs the duration of the block and reduces the need for rescue analgesia as been proved in many studies before [26,27].

Regarding demographic characteristics in this study, age, sex, weight and ASA, operation duration and anesthesia duration, there were no statistical significant differences between the two study groups.

There were no statistical significant differences between both study groups regarding heart rate (T0) and (T1) but T2 heart rate was significantly lower in Bupivacaine & Dexmedetomidine group (Group B) ($p < 0.001$).

Regarding, Mean Blood Pressure there was No statistical significant differences between the study groups regarding T0 and T1 Mean blood pressure but T2 Mean blood pressure was significantly lower in Bupivacaine & Dexmedetomidine group (Group B) ($p < 0.008$).

In agreement with our results, Esmoğlu and his colleagues [28] found that adding 100µg dexmedetomidine to the local anesthetic in axillary brachial plexus blockade during elective forearm and hand surgeries caused obvious declining in systolic blood pressure, diastolic blood pressure and heart rate.

In our study, Regarding Intra operative Fentanyl Consumption (µg/kg) was significantly lower in Bupivacaine & Dexmedetomidine group (Group B) ($p < 0.003$).

With our study, Mohta et al., [29] assessed the impact of the use of dexmedetomidine as an additive to bupivacaine in the paravertebral block during breast cancer surgery. the mean intraoperative fentanyl requirements were lower in (bupivacaine with dexmedetomidine group) (54.6µg) than (bupivacaine alone group) (58µg).

While against our results, Gad and El-Metwally [30] assessed the Efficacy of adding dexmedetomidine as adjuvant with levobupivacaine in ultrasound-guided serratus plane block for modified radical mastectomy surgery, the total intraoperative fentanyl requirement was insignificantly different between levobupivacaine alone and levobupivacaine-dexmedetomidine groups. This difference may be due to the difference in the type of surgery or LA used.

As Demonstrated in this study, Postoperative pain (VAS-10) among both study groups was non-significantly lower in Bupivacaine & Dexmedetomidine group throughout follow-up time points, but the differences were statistically significant at hour-8, 12 and 24.

Going with our study Wang Q et al., [31], proved that adding 1 of µg/kg dexmedetomidine to 0.375% ropivacaine in ultrasound-guided erector spinae plane block in thoracotomy had a better analgesic effect at 12, 24 and 48h after surgery, while there was no significant difference in the analgesic effect between his two groups at 2 and 4h after surgery. The main reason was that ropivacaine nerve block alone had difficulty maintaining a good anesthesia effect after 6-8h.

Also, our study showed that, post-operative morphine consumption was significantly lower in

Bupivacaine & Dexmedetomidine group. Time to first postoperative dose was significantly longer in Bupivacaine & Dexmedetomidine group (Group B) range 8-12hr, p -value (<0.001).

Going with our study Xu et al., [32], the authors found that adding 0.5 μ g/kg dexmedetomidine to 0.25% ropivacaine for transversus abdominis plane block and rectus sheath in patients undergoing emergency abdominal surgeries reduced the total amount of opioids consumptions in the first 24 hours after abdominal surgery.

With our study, Abdelaal et al., [33], showed that the addition of dexmedetomidine (100 μ g) to levobupivacaine (20ml of 0.375%) in transverse abdominis plane block after abdominoplasty delayed the time to the first analgesia request compared with levobupivacaine alone (205 \pm 10.2 min vs. 181 \pm 12.6min; p <0.001) and also decreased total 24-h pethidine consumption (136 \pm 13.4 vs. 172 \pm 15.8mg; p <0.001).

In agreement with these results, Manzoor et al., [34] demonstrated that addition of dexmedetomidine to bupivacaine (30ml of 0.25%) in Pectoralis Nerve Block (Pecs II) significantly prolonged the duration of postoperative analgesia by ~40% compared with the use of bupivacaine alone (1024.0 \pm 124.9 vs. 726.4 \pm 155.3min; p <0.001).

With our results, Zhixin Gao and his colleagues 35 showed that Dexmedetomidine, which was used as an adjuvant of Erector Spinae Block with ropivacaine, prolonged sensory block duration, provided effective acute pain control after surgery, and reduced the need for rescue analgesia for patients undergoing video-assisted thoracoscopic lobectomy surgery.

Also with this study, Xunxun Wang and his colleagues 36 founded that dexmedetomidine combined with 0.33% ropivacaine Erector spinae plane block in patients undergoing modified radical mastectomy can better provide postoperative analgesia than without dexmedetomidine performance, thus improving postoperative analgesia and comfort level.

In our study, Regarding Post-operative complications related to morphine consumption (nausea, vomiting and pruritus) were less frequent in Bupivacaine & Dexmedetomidine group, but the differences were statistically significant only in nausea.

With our results, Aksu and his colleagues [37] showed that addition of dexmedetomidine to bupivacaine on transverse abdominis plane block in patients undergoing Abdominal surgeries that

PONV was significantly lower in the group with dexmedetomidine. This may be owing to the use of less postoperative opioids in the group with dexmedetomidine.

Conclusion:

The addition of dexmedetomidine to bupivacaine in US-guided Erector Spinae block during spine surgery reduce both intra operative fentanyl consumption and post operative morphine consumption, significantly prolong time to first post-operative morphine dose and reduces post-operative Nausea, vomiting (PONV) and pruritis owing to lowering the total opioid consumption compared with bupivacaine alone.

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مقارنة بين تخدير العضلات الناصبة للعمود الفقري عن طريق جهاز الموجات فوق الصوتية باستخدام عقار البيوبيفاكين وحده مقارنة باستخدام عقار البيوبيفاكين مع عقار الديكسميداييتوميدين لتسكين الألم بعد الجراحة في المرضى الذين يخضعون لعمليات العمود الفقري دراسة عشوائية مزدوجة التعمية

تظل المواد الأفيونية الدعامة الأساسية لعلاج الألم بعد الجراحة على الرغم من وجود أدلة قوية على عيوبها، التخدير، الدوخة، الغثيان، القيء، الإمساك، الاعتماد الجسدي، التحمل، تثبيط الجهاز التنفسي، إلخ.

تقنيات التخدير الموضعي عن طريق (تخدير الأعصاب الطرفية) باستخدام جهاز الموجات فوق صوتية هي أكثر الطرق فعالية لعلاج آلام ما بعد الجراحة.

تخدير العضلات الناصبة للعمود الفقري عن طريق جهاز الموجات فوق الصوتية يتم عن طريق تخدير الأعصاب الطرفية ويعتبر جديد نسبياً حيث ظهر لأول مرة عام ٢٠١٦م ليستخدم في عمليات الصدر وتكميم المعدة ومنظار الكلى والمرارة والعمود الفقري وكسر أضلع القفص الصدري.

إضافة عقار الديكسميداييتوميدين إلى المخدر الموضعي في تخدير الأعصاب الطرفية أثبتت فعاليته في إطالة مفعول تخدير الأعصاب وتقليل نسب استهلاك المورفين.

الهدف من البحث :دراسة مدى فعالية وتأثير عقار الديكسميداييتوميدين في تقليل الألم ما بعد عمليات العمود الفقري عند إضافته كمساعد لتخدير العضلات الناصبة للعمود الفقري.

طريقة البحث :تم القيام بتخدير العضلات الناصبة للعمود الفقري الموجه بالموجات فوق الصوتية على ٧٠ مريضاً مقسماً بالتساوي إلى مجموعتين ٣٥ لكل منهما، تم تلقي المجموعات [A] بوبيفاكين فقط والمجموعة [B] التي تلقت بوبيفاكين مع إضافة الديكسميداييتوميدين. وسيتم تسجيل استهلاك المورفين بعد العملية الجراحية لمدة ٢٤ ساعة، واستهلاك الفنتانيل أثناء العملية، ودينا ميكا الدم أثناء العملية (نبض القلب وضغط الدم)، والآثار الجانبية (الغثيان والقيء والطفح الجلدي).

الاستنتاج :إضافة عقار الديكسميداييتوميدين إلى عقار البيوبيفاكين في تخدير العضلات الناصبة للعمود الفقري عن طريق جهاز الموجات فوق الصوتية في عمليات العمود الفقري أدى إلى استهلاك أقل للمورفين بعد العملية واستخدام أقل للفنتانيل داخل العملية وتقليل الآثار الجانبية الناتجة عن استخدام المواد الأفيونية كالغثيان والطفح الجلدي.