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Ultrasound Guided Genicular Nerve Block for Knee Arthroscopy. Comparing using Bupivacaine Alone Versus Bupivacaine and Dexmedetomidine for Acute Post Operative Pain Management: A Comparative Controlled Study

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Abstract

Background: During knee artroscopy, mechanical and thermal trauma can cause muscle ischemia and damage to nerves innervating the knee joint. 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 in genicular nerve block for postoperative analgesia in knee surgery.

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

Results: Intra operative Fentanyl Consumption (µg/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 and 12. 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 genicular nerve block during knee arthroscopy 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 lowering the total opioid consumption compared with bupivacaine alone.

Key Words: *Post-operative nausea – Vomiting – Genicular nerve block.*

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Introduction

KNEE arthroscopy is a common procedure and is increasing in frequency. Effective post-operative pain management is especially critical in ACLR for expedited recovery, rehabilitation goals, and patient satisfaction. Previously, physicians had been encouraged to be more aggressive in treating their patients' pain with opioids. However, opioid use has increased to the point that the current situation in the USA is considered an epidemic. In a recent database study of surgical patients without a history of misuse or ongoing opioid use, researchers revealed a 44% increase in misuse for every opioid refill. There has been a call for evidence-based guidelines for prescribing post-operative opioids after orthopaedic surgical procedures. A recent review determined that a major limitation in development of such guidelines was the "lack of data on post-discharge use of opioids as well as the paucity of studies focusing directly on recording patterns in the post-operative opioid consumption.

In a survey of orthopaedic surgeons, Herkowitz et al., reported overwhelming surgeon support for the development of proven, effective, and safe ways to decrease reliance on opioids for post-opera-

tive pain management. Current methods of regional anaesthesia widely used in knee arthroscopy often involve more proximal nerves of the lower extremity [femoral nerve block, adductor canal block, and sciatic nerve block]. They can be effective tools for pain control, but complications can include hematoma, local anaesthetic systemic toxicity, rebound pain, and vessel or nerve damage. It is suggested that the ideal anaesthetic for outpatient knee arthroscopy should be a sensory-only blockade that is technically simple, rapid onset of action, highly effective; have few or no side effects; and be relatively inexpensive. The knee is innervated by branches from the femoral, obturator, and sciatic nerves. However, there is no exact agreement on the relative contribution from each of these nerves. Anatomically, there are two main divisions of identified terminal sensory branches, often termed "genicular" nerves, with the anterior division innervating the anterior, medial, and lateral knee capsule, fat pad, and deeper structures. We used this information to develop an anaesthetic technique focused on this genicular nerve.

Aim of the work:

The aim of this study was to investigate the efficacy of genicular nerve block in knee Arthroscopy, comparing using bupivacaine alone versus bupivacaine plus dexmedetomidine.

Patients and Methods

Study design: Randomized controlled study.

Study setting and location: The study was conducted at Souad Kafafi University Hospital-Misr University of science and Technology (MUST).

Study population: Patients aged from 21 to 60 years old, scheduled for knee arthroscopy. Subjects presented for knee scope surgery were randomized in a 1:1 ratio to either an ultrasound-guided genicular nerve block using bupivacaine only (group A) or ultrasound-guided genicular nerve block using bupivacaine and dexmedetomidine (Group B). Primary outcome of this study was morphine consumption within the first 12 hours following surgery.

This Study duration was during 2023.

Eligibility criteria:

Inclusion criteria: Patients scheduled for knee scope surgery. >21 years old. ASA classification I, II, III. Ability to sign the consent. BMI 18-40kg/m^2.

Exclusion criteria: <21 years old. Refusal to participate. Chronic opioid use. History of chronic pain. History of psychiatric disorder. History of diabetes mellitus with documented or symptomatic peripheral neuropathy. Allergy to medication of the study.

Study procedures:

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

Study protocol: All Patients had an informed written consent, which include; 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 and Metoclopramide 10mg. Upon Arrival to the operating room, the standard Monitoring was applied which included: Pulse Oximeter, Non-invasive Blood Pressure & Six-lead electrocardiogram (ECG).

Single injection genicular nerve block technique:

The ultrasound-guided genicular nerve block was performed through (Mindray diagnostic ultrasound system model DC-42) at the site of the superior lateral, the superior medial, and the inferior medial genicular nerves. The superior lateral genicular nerved was located at the confluence of the lateral femoral shaft and the lateral femoral condyle (in the anteroposterior plane) and at the midpoint of the femur lateral plane). The superior medial genicular nerve site is located at the confluence of the medial femoral shaft and the medial femoral condyle (in the anteroposterior plane) and at the midpoint of the femur (in the lateral plane). The inferior medial genicular nerve site was located at the confluence of the medial tibial shaft and the tibial flare (in the anteroposterior plane) and the midpoint of the tibia (in the lateral plane). Colour Doppler was used to identify the arterial structures which serve as landmarks for the corresponding nerves. All nerve blocks were performed by an anaesthesiologist experienced in regional anaesthesia. After skin local anaesthetic infiltration, a 10cm 21G insulated block needle was inserted from the lateral aspect of the ultrasound probe and aligned with the ultrasound scanning plane (in-plane approach). In this way, both the needle shaft and tip could be visualized as the needle approaches the genicular nerve. The needle was redirected as needed. Once satisfactory position of the needle time is confirmed and after frequent negative aspiration, 5mL of a solution containing 15ml of 0.25% Bupivacaine with 5mL saline, was slowly injected. Spread of local anaesthetic was documented adjacent to the target nerve in real time. This procedure was performed at the site of the three genicular nerves described above to the group A. then, this was performed to the group B in addition to 2ml of dexmedetomidine (0.5mic/kg).

The General Anaesthesia was induced using: Propofol 1-2mg/kg, Fentanyl 1-2µg/kg and Atracurium 0.5mg/kg. it will be maintained using Sevoflurane 1MAC, Incremental doses of Atracurium.

Patients of both groups had their pain severity evaluated using Visual Analogue Scale (VAS) Numeric pain distress scale graded from 0 to 10 at 1st hr, 4,8, and 12, hours postoperatively. Supplementary analgesia was given when VAS >_4 Supplementary analgesia will be given when VAS >_4 of Morphine 0.05mg/kg with maximum dose Morphine 0.4mg/kg within 24 hrs. Adjust dose-based on degree of response, and the patient will be excluded from the study.

Study outcomes:

Primary outcome measures:

Morphine consumption:

Total opioids consumption [Time Frame: 0-12 Hours].

Secondary outcome measures:

Haemodynamic including: HR, Bp and O2 saturation. Pain scores [Time Frame: 0-12 Hours]. Visual Analogue Scale (VAS). Numerical Rating Scale Pain Scores (Range: 0-10, where 0 is no pain and 10 is the worst pain).

Opioid-Related Adverse Events [Time Frame: 0-12 Hours]: Nausea, Vomiting, Pruritis, Respiratory Depression, Constipation Block/Infusion-Related Adverse Events [Time Frame: 0-12 Hours]: Allergic reaction to the local anaesthetic.

Statistical analysis:

Sample size: Sample size was calculated using G-power software using data obtained from previous studies on related US guided blocks for similar procedures. Calculation of the sample size revealed that at least 30 patients are needed in each group to detect a difference in the average time to supplemental analgesia as small as 1.5 times its standard deviation with a power of 0.9 and a significance level of 0.05. The sample size was increased by 20% (i.e. 6 patients in each group) to compensate for dropouts. We will increase the number to 70 (35 in each group) to compensate for possible dropouts.

Statistical analysis: Data will be presented as mean±SD (if numerical and normally distributed) and with median (range) (if not normally distributed). Categorical data will be presented as number and frequency. Student *t*-test will be used to compare data if normally distributed. Mann-Whitney test will be used if the data are not normally distributed. Categorical variables with the $\chi 2$ test. The level of significance will be set at $p<0.05$ for two-tailed tests. Statistical analysis will be performed using SPSS for Windows version 15.0 (SPSS Inc., Chicago, IL, USA).

Results

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

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

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

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

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

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

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

^Independent *t*-test.

Table (3) showed that: No statistically 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 statistically 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 (VAS10) 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.

Figure (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 (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 Range	78.2±5.2 67.0–91.0	79.7±5.9 66.0–95.0	^ 0.279	Mean ± SE 95% CI	-1.5±1.3 -4.1–1.2
T1	Mean ± SD Range	73.9±5.3 62.0–86.0	75.1±5.9 63.0–90.0	^ 0.352	Mean ± SE 95% CI	-1.3±1.3 -3.9–1.4
T2	Mean ± SD Range	62.9±5.6 50.0–75.0	70.5±6.2 58.0–86.0	^ <0.001*	Mean ± SE 95% CI	-7.6±1.4 -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 Range	99.2±8.7 77.0–112.0	98.8±8.7 82.0–117.9	^ 0.848	Mean ± SE 95% CI	0.4±2.1 -3.8–4.6
T1	Mean ± SD Range	87.9±8.6 67.0–100.0	85.6±9.0 66.0–107.0	^ 0.271	Mean ± SE 95% CI	2.3±2.1 -1.9–6.6
T2	Mean ± SD Range	74.7±6.9 59.0–82.0	80.1±9.3 60.0–103.0	^ 0.008*	Mean ± SE 95% CI	-5.3±2.0 -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 Range	1.7±0.8 0.0–3.0	2.5±1.3 0.0–5.0	^ 0.003*	Mean ± SE 95% CI	-0.8±0.3 -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 (VAS10-) 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	^	Mean ± SE	-0.5±0.2
	Range	2.0–4.0	2.0–6.0	0.013*	95% CI	-0.9–-0.1
Hour-12	Mean ± SD	4.1±0.7	5.2±1.2	^	Mean ± SE	-1.1±0.2
	Range	3.0–5.0	3.0–7.0	<0.001*	95% CI	-1.5–-0.6
Hour-24	Mean ± SD	3.2±0.8	3.9±0.9	^	Mean ± SE	-0.8±0.2
	Range	2.0–4.0	3.0–5.0	<0.001*	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.

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

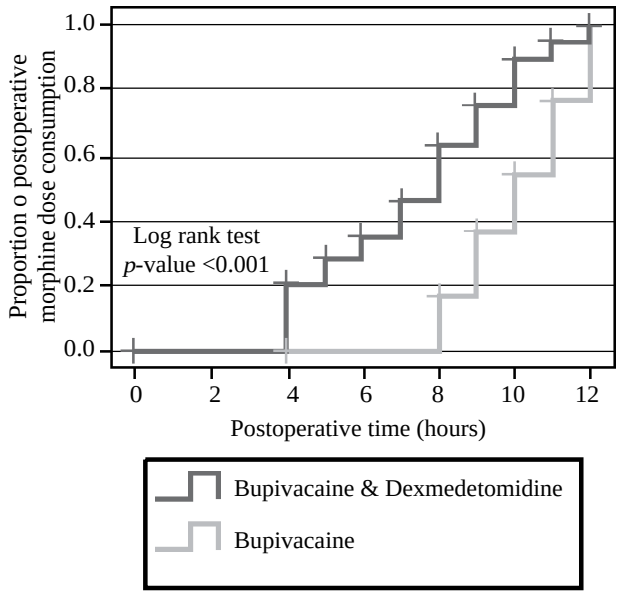

Fig. (1): Kaplan-Meier curve for rate of first postoperative morphine dose.

Discussion

Total knee arthroplasty (TKA) is a successful intervention for patients with painful degenerative diseases affecting the knee joint. The management of pain after TKA has always been a key focus in the clinical treatment of patients undergoing this procedure [1].

Postoperative pain leads to decreased ability to mobilize the knee, prolonged hospitalization and increased complications. Despite comprehensive multimodal analgesic regimens, this problem has not been successfully addressed. Peripheral nerve blocks are increasingly preferred to relieve postoperative pain and to reduce opioid consumption and opioid-related adverse effects in patients undergoing orthopedic procedures [2].

Femoral nerve block (FNB) has been one of the most commonly used peripheral nerve blocks for managing post-TKA pain. Compared with epidural or intravenous patient-controlled analgesia alone, addition of FNB to an analgesic regimen provides superior pain control, reduces the incidence of postoperative complications and shortens the time to functional recovery [3].

Adductor canal block (ACB) is a relatively new type of peripheral nerve block technique introduced [4]. It offers better patient management after TKA than FNB. ACB affects not only the two largest sensory contributors from the femoral nerve to the knee, namely, the saphenous nerve and the branch to the vastus medialis, but also the articular branches of the obturator nerve. However, the block is distal to most of the efferent branches to the quadriceps muscle and therefore largely preserves the strength of this muscle [5].

Dexmedetomidine, the pharmacologically active dextroisomer of medetomidine, is a selective α_2-adrenoceptor agonist currently used for its sedative, analgesic, and sympatholytic properties. Dexmedetomidine induces analgesia by action at the locus coeruleus and at the spinal cord, inhibiting nociceptive process. This pathway is mediated by α_{2A}-adrenoceptor subtypes [6].

Dexmedetomidine becomes an attractive alternative to the current opioid analgesics because it does not have a respiratory depressant effect or addictive potential. To date, there are few controlled studies published about the analgesia-sparing effect of dexmedetomidine as a primary end point in the early postoperative period [7].

The study was conducted at Souad Kafafi University Hospital-Misr University of science and Technology (MUST). The aim of this study was to investigate the efficacy of genicular nerve block in knee Arthroscopy. Comparing using bupivacaine alone versus bupivacaine plus dexmedetomidine.

The main results were as followed:

In our current study showed that there were statistically significant differences between the study groups regarding demographic characteristics; age, sex, weight and ASA.

Our results were consistent with Park SK [8] who aimed to evaluate the additional effects of fentanyl as an adjuvant in spinal anaesthesia with hyperbaric ropivacaine under dexmedetomidine sedation. Their study conducted on fifty patients (aged 18 to 40 years) scheduled for elective lower limb surgery under spinal anaesthesia were randomly assigned in a double-blind fashion to receive either hyperbaric ropivacaine 15mg (Group R) or hyperbaric ropivacaine 15 mg with intrathecal fentanyl 20μg (Group RF). Intravenous dexmedetomidine (1 μg/kg for 10min, followed by 0.5μg/kg/h) was administered in both groups. There was no significance between the studied groups regarding age, weight, height, ASA and sex.

Also, our results agree with Sayed W [9] who evaluated whether bupivacaine alone could provide a noninferior duration of block compared with bupivacaine and fentanyl when intravenous dexmedetomidine was administered intraoperatively. Their study was conducted on fifty-six patients scheduled for total knee arthroplasty under spinal anaesthesia were randomly allocated to receive either bupivacaine 13mg with intrathecal fentanyl 20μg (Group BF) or bupivacaine 13mg (Group B). There was no significant difference in the studied groups regarding age, sex, and ASA.

Also, Abd Elrahman AA [10] who studied the sedative effect of dexmedetomidine administered

by two different routes. Their study was included 100 patients including 50 cases in each group. They reported that there was no significance between the studied groups regarding age, weight, height, ASA and sex.

Also, Lee SC *[7]* who compare the effect of adding dexamethasone to bupivacaine on duration of sensory and motor blockade of the popliteal sciatic nerve block in below knee surgeries. Their study was included 50 cases. Group A (25 patients): Received 2ml of dexamethasone (8mg) added to 28ml 0.5% bupivacaine (20ml for sciatic nerve block and 10ml for saphenous nerve block). Group B (25 patients): received 2ml of normal saline added to 28ml 0.5% bupivacaine without dexamethasone (20ml for sciatic nerve block and 10ml for saphenous nerve block). There was no significance between the studied groups regarding age, sex, ASA.

Our study showed that there were no statistically significant differences between the study groups regarding operation duration and anesthesia duration.

Our results were consistent with Salah D *[11]* who reported that there was no significance between the studied groups regarding operation duration and anesthesia duration.

Also, Lee SC *[7]* who reported that there was no significance between the studied groups regarding operation duration.

In our study showed that statistically significant differences between the study groups regarding T0 and T1 heart rate. T2 heart rate was significantly lower in Bupivacaine & Dexmedetomidine group. Also, there was no statistically significant differences between the study groups regarding T0 and T1 mean blood pressure. T2 mean blood pressure was significantly lower in Bupivacaine & Dexmedetomidine group.

Our study supported with Adib F *[12]* who reported that there was no significance between the studied groups regarding heart rate. There were no significant differences in the BIS at 20min after infusion, postoperative pain score, and cumulative dose of opioids in case of additional intrathecal fentanyl. In both groups, intraoperative bradycardia was observed at a high rate, and hypotension was observed in one patient; however, the difference was not significant.

Also, Elcıcek K *[13]* who reported that there was no significance between the studied groups regarding T0 and T1 mean blood pressure.

Intravenous dexmedetomidine administration offers several advantages, such as sedation without respiratory depression, postoperative analgesia, and a decrease in the first 24-hour opioid use after surgery *[8]*.

In our current study showed that regarding intra operative Fentanyl Consumption was significantly lower in Bupivacaine & Dexmedetomidine group.

Kim TH *[7]* conducted a study to evaluate the effects of intrathecal fentanyl 20μg in spinal anaesthesia with bupivacaine during dexmedetomidine sedation. Their study also did not report any significant differences in the adverse effects after fentanyl administration than without additional fentanyl.

Our results were consistent with Salah D, *[14]* who reported that the results imply that intrathecal fentanyl may not be necessary in spinal anesthesia with ropivacaine for lower limb surgery if intravenous dexmedetomidine is administered.

Also, Esmail MH *[10]* who reported that the duration of spinal anaesthesia with bupivacaine alone is noninferior to that of bupivacaine plus fentanyl in patients receiving intravenous dexmedetomidine intraoperatively. Their results suggest that intrathecal fentanyl may not be required when intravenous dexmedetomidine is administered.

Our study showed that Postoperative pain (VAS10) 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.

Also, Choi SR *[7]* who reported that Group A: There was a highly significant increase in VAS all over the postoperative 24 hrs. In comparison with 1 hr postoperatively there was a significant increase in the VAS started 8 hrs postoperatively continued after 10 hrs, 12 hrs, 16 hrs, 20 hrs and 24 hrs postoperatively. Group B: There was a highly significant increase in VAS all over the postoperative 24 hrs, in comparison with 1 hr postoperatively there was a significant increase in the VAS started 5 hrs postoperatively, which continued after 6 hr, 8 hrs, 10 hrs, 12 hrs, 16 hrs, 20 hrs and 24 hrs postoperatively. Between the two study groups: VAS was highly significantly higher in group B when compared with group A; started 3 hrs postoperatively and continued after 4 hrs, 5 hrs, 6 hrs, 8 hrs, 10 hrs, 12 hrs postoperatively.

Our results were consistent with Al-Ghanem SM *[3]* who reported that the postoperative pain score and cumulative dose of analgesics in 24 hours after surgery had no difference between the two groups; however, the mean time to the first request of analgesics in Group R (176.8±90.4 min) was shorter than that in Group RF (252.0±190.9 min), but not statistically significant.

Studies to compare the effects of ropivacaine with bupivacaine for spinal anaesthesia. In their studies, 15mg of hyperbaric ropivacaine alone could provide sufficient anaesthesia for lower limb surgery and hip surgery.

This is in agreement with Al-Zaben KR [15] who found that dexmedetomidine prolongs motor and sensory block of spinal anaesthesia intravenous dexmedetomidine.

Our study disagrees with Qudaisat IY [16] who conducted on Group B received 0.25% bupivacaine 2mg·kg^{-1} (0.8ml·kg^{-1}). Groups BD1 and BD2 received dexmedetomidine 1 and 2μg·kg^{-1}, respectively along with bupivacaine 2mg·kg^{-1} in a total volume of 0.8ml·kg^{-1}. Anaesthesia was induced and maintained with sevoflurane in 100% oxygen. Time to first analgesia requirement was significantly longer in BD1 and BD2 groups compared to B group with mean values (95% CI) of 809min (652–965), 880 (733–1026), and 396 (343–448), respectively, p<0.001. Also, they reported that the dexmedetomidine groups had significantly higher postoperative sedation scores compared to plain bupivacaine group that were dose dependent and for longer time in BD2 group.

Our study showed that 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. In current study showed that rate of need to first postoperative morphine dose was significantly slower in Bupivacaine & Dexmedetomidine group.

Our study agrees with Kim WH [8] who reported that p postoperative paracetamol analgesic requirements over 24 h were higher in group B compared to BD1 and BD2 groups (Mean (95% CI): 3.2 (2.9–3.5) doses, 1.9 (1.5–2.3), and 1.6 (1.3–1.9), respectively), p<0.001.

Also, our results agree with Esmail MH [10] who reported that showed no significant differences between the two groups (Group B group BF) regarding need to first morphine dose.

Also, Hauritz RW [17] who reported that In group A, all the 25 patients (100%) requested their first analgesia through the first 12 hrs postoperative, while in group B 11 patients (44%) requested their first analgesia through the first 12 hrs postoperative and 14 patients (56%) requested their first analgesia through the second 12 hrs postoperatively, with statistically significant difference between the 2 study groups. As regarding total rescue analgesic dose given (Nalbuphine IV) it was statistically significantly lower in group A than in group B.

Similarly, Rambhia M [18] who compared the postoperative duration of sensorimotor blockade with either dexamethasone or saline added to bupivacaine-epinephrine had reported that addition of 8mg dexamethasone to 0.5% bupivacaine-epinephrine significantly prolongs the duration of sensorimotor popliteal sciatic nerve blockade, and reduces pain and opioid consumption in patients after major hind foot and ankle surgery, but there was no significant difference regarding of the effect on onset and duration of sensory and motor block.

Rambhia M. et al., [19] had reported that high dose perineural dexamethasone, but not systemic dexamethasone, combined with bupivacaine prolonged the duration of both sensory and motor block of mouse sciatic nerve.

Lee SC [7] showed in their study that dexamethasone addition significantly increases the duration of analgesia in patients receiving low volume supraclavicular brachial plexus block, although they reported that also the onset of sensory and motor block was significantly earlier in dexamethasone-receiving group compared to control group.

Sayed W [20] who reported opioid consumption at 24 hours was significantly lower in the BLOCK group compared with the SHAM group (23±20 vs 58±35, p<0.001), and this difference remained significant at 48 hours (50±40 vs 98±56, p=0.004). Pain scores were reduced in the BLOCK group at time 6 hours (2.6±1.9 vs 4.3±2.2, p=0.012), but were otherwise similar at remaining time points. Patient satisfaction at 24 hours and 20 m walk test times were similar between groups.

Our study showed that post-operative nausea, vomiting and pruritus were less frequent in Bupivacaine & Dexmedetomidine group, but the differences were statistically significant only in nausea.

Our results were consistent with Abu-Halaweh SA [15] who reported that there was no significance between the studied groups regarding in adverse effects associated with the block between the two groups.

Our results disagree with Choi SR [7] who reported that there was no significance between the studied groups regarding vomiting, itching and nausea. The most common side effects of dexmedetomidine are hypotension and bradycardia. When dexmedetomidine is used with spinal anaesthesia, it may increase the frequency of such side effects. In this study, hypotension occurred in five patients in two groups.

Also, our study disagrees with Eldemrdash AM [10] who reported that there were significance differences between the studied groups regarding post-operative side effect. Two patients in BD2 group developed bradycardia and hypotension, and one developed urine retention compared to none in other groups.

Conclusion:

After the previous result we can safely conclude that, the addition of dexmedetomidine to bupivacaine in US-guided genicular nerve block during knee arthroscopy reduces both intra operative fen-

tanyl consumption and post operative morphine consumption. It significantly prolongs time to first postoperative 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 تخدير العصب الجينى عن طريق الموجات فوق الصوتيه باستخدام عقار البيوبيفيكين وحده مقارنة باستخدام عقار البيوبيفيكين مع الديكسميتوميدين لتخدير الالم ما بعد عمليات منظار الركبة: دراسة مقارنة منتظمه

تظل المواد الأفيونية الداعم الاساسى لعلاج الألم بعد الجراحة على الرغم من وجو د أدلة قوية على عيوبها؛ منهار، الدوخة، الغثيان، القىء، الإمساك، الاعتماد الجسدى، التحمل، تثبيط الجهاز التنفسى، إلخ.

تقنيات التخدير الموضعى عن طريق (تخدير الاعصاب الطرفية) باستخدام جهاز الموجات الفوق صوتية هى أكثر الطرق فعالية لعلاج آلام ما بعد الجراحة.

اضافه عقار الديكسميدايتوميدين إلى المخدر الموضعى فى تخدير الاعصاب الحسية للركبة اثبت فعاليته فى اطاله مفعول تخدير الاعصاب وتقليل نسب استهلاك المورفين.

الهدف من البحث: دارسة مدى فعالية وتأثي ر عقار الديكسميدايتوميدين فى تقليل الألم ما بعد عمليات منظار الركبة عن طريق اضافته كمساعد لتخدير الاعصاب الحسية للركبة .

طريقه البحث: تم القيام بتخدير الاعصاب الحسية للركبة عن طريق الموجه بالموجات فوق الصوتية على ٧٠ مريضاً مقسمًا بالتساوى إلى مجموعتين ٣٥ لكل منهما، تم تلقى المجموعات (أ) بوبيفاكين فقط والمجموعة (ب) التى تلقت بوبيفاكين مع إضافة الديكسميدايتوميدين. وسيتم تسجيل استهلاك المورفين بعد العملية الجارحية لمدة ١٢ ساعة، واستهلاك الفنتانيل أثناء العملية، وديناميكا الدم أثناء العملية (نبض القلب وضغط الدم)، والآثار الجانبية (الغثيان والقىء والطفح الجلدى).

النتائج التى توصلت اليها هذه الدراسه: مرضى – استهلاك المورفين بعد انتهاء الجراحة فى ال ١٢ ساعة التالية كان اقل بفارق احصائى كبير فى المجموعة (ب) مقارنه بمرضى المجموعة (أ).

– ديناميكية الدم (نبض القلب وضغط الدم) كانت أقل بفارق احصائى كبير فى مرضى المجموعة (ب) مقارنة بمرضى المجموعة (أ).

– الغثيان كان أقل فى مرضى المجموعة (ب) من المجموعة (أ).

الاستنتاج: اضافه عقار الديكسميدايتوميدين الى عقار البيوبيفاكين فى تخدير الاعصاب الحسية للركبة عن طريق جهاز الموجات فو ق الصوتية فى عمليات منظار الركبة أدى الى استهلاك اقل للمورفين بعد العملية واستخدام أقل للفينتانيل داخل العملية وتقليل الاثار الجانبية الناتجة عن استخدام المواد الأفيونة كالغثيان والطفح الجلدى.