

Effects of Dexmedetomidine & Fentanyl as Adjuncts to Bupivacaine for Postoperative Analgesia in Subarachnoid Block of Urological Surgeries

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Abstract

Background: Spinal anesthesia is preferred for its quick action, reliability, and fewer complications, aiding in faster recovery and enhanced postoperative outcomes in elective urologic surgeries. Adjuvants like fentanyl and dexmedetomidine enhance spinal anesthesia, improving analgesia duration and hemodynamic stability. This study aims to compare the analgesic efficacy, hemodynamic profile, and adverse effects of dexmedetomidine and fentanyl.

Methods: Adult patients aged 18-50 years, ASA physical statuses I and II, undergoing elective urological surgery were selected for the study. Sixty patients were enrolled following inclusion and exclusion criteria and divided into two groups. One group received 0.2 ml (10 mcg) fentanyl with 1.8ml hyperbaric bupivacaine while the other group received 0.2ml (5mcg) dexmedetomidine with 1.8 ml hyperbaric bupivacaine. The patients in post-operative period received analgesics when VAS score was equal or more than 4. By maintaining the standard operative procedure heart rate and blood pressure were measured at 5 min, 10 min, 15 min, 30 min, 45 min, 60 min, 75 min, 90 min, 105 min, 120 min, 6-hour, 12 hour and 24 hours. After completing the surgery VAS at first analgesic request, duration of analgesia was also recorded. VAS at 0-hour, 1 hour, 3-hour, 6-hour, 12-hour and 24-hour was also recorded respectively. Patients were monitored for side effects e.g. nausea, bradycardia, hypotension, pruritus, shivering.

Results: Combining dexmedetomidine with bupivacaine yielded superior analgesic effects in urological surgery patients compared to bupivacaine and fentanyl. Dexmedetomidine reduced postoperative pain scores ($p=0.002$) and analgesic like paracetamol ($p<0.001$) or pethidine ($p<0.001$) requirement. It prolonged analgesia ($p<0.001$) and caused less side effects like nausea ($p=0.011$). Up to 120 minutes, SBP, DBP, MAP, HR were stable in experimental group while it was elevated in control group.

Conclusion: Addition of dexmedetomidine with bupivacaine for urological surgeries under subarachnoid block resulted in superior analgesia for a longer duration without demand for additional analgesia & fewer side effects (nausea, hypotension, bradycardia, pruritus, shivering) compared to fentanyl with bupivacaine.

Keywords: Dexmedetomidine, Fentanyl, Bupivacaine, Postoperative Analgesia, Subarachnoid block, Urological surgery

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Introduction

Urological procedures frequently involve anaesthesia, which can be local, regional, or general, depends upon patient's condition with

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numerous co-morbidities¹. These patients may have significant physiological disruption from a number of modest treatments or substantial reconstructive surgery. Along with providing anaesthesia, the anesthetist's duties also include managing postoperative analgesia². The anesthetic technique used in urological surgery depends on the procedure and patient's needs. Regional anaesthesia allows faster return to normal respiration, continuous neurological assessment, and early detection of cerebral irritation from irrigation fluid absorption in TURP³. Regional anaesthesia also offers several benefits like earlier postoperative oral intake, better pain relief, lower risks of deep vein thrombosis, less respiratory complications, and easier neurological symptom detection for transurethral resection syndrome⁴. Procedures for neuraxial regional anaesthesia can involve spinal, epidural, or combined spinal-epidural approaches⁵. Spinal anaesthesia is a safer and more preferred method due to its quick action, reliability, significant sensory and motor block, and fewer complications⁶. Therefore, spinal anaesthesia (SAB) is one of the most widely used neuraxial regional anaesthesia methods in adult which is particularly suitable for elective, short-duration, and pelvis-limited urologic surgery^{6,7}.

In August 1898, August Bier introduced cocaine for the first time into the subarachnoid area⁸. Lidocaine is a common anesthetic used in urologic treatments. Patients who have spinal anaesthesia with hyperbaric 2% or 5% lidocaine recover quickly. The incidence of temporary neurologic effects has, however, led to some editorials questioning the use of lidocaine for spinal anesthetic. Researchers are suggesting the use of small doses of spinal bupivacaine for less than an hour surgical procedures⁹. Subarachnoid block is now widely practiced, with 0.5% bupivacaine being the most common drug used¹⁰. Bupivacaine is the primary medication used for spinal anaesthesia, which works by blocking voltage-gated sodium channels¹¹. Bupivacaine is a local anesthetic belonging to the amide group, known for its high potency, slow onset (5-8 minutes), and long duration of action. Bupivacaine has limited anaesthesia duration. While bupivacaine provides effective sensory blockage, patients may experience pain, discomfort, and hemodynamic

instability, necessitating analgesic supplementation in the early postoperative phase¹². Adjuvants can prolong analgesia duration in spinal anaesthesia. Opioids, when combined with bupivacaine, provide numerous benefits such as stable hemodynamics, denser analgesia, fewer pulmonary complications, earlier patient ambulation, and reduced stress response¹³. In central neuro-axial blockade, opioids are frequently used to local anesthetics because they improve intraoperative and early postoperative analgesia. Adjuvants like morphine, buprenorphine, pethidine, tramadol, hydromorphone, sufentanil, and fentanyl have been introduced to spinal local anesthetics for their effectiveness¹². Tramadol as adjunct in paediatric subumbilical urological surgeries through caudal epidural route resulted in prolonged optimal analgesia¹⁴.

Dexmedetomidine, when combined with bupivacaine for spinal anaesthesia, shortens motor block onset and prolongs motor and sensory block duration, maintaining hemodynamic stability and avoiding sedation¹⁵. It provides better perioperative hemodynamic stability than many other adjuvants now in use and good quality of intraoperative and prolonged post-operative analgesia with minimal side effects. Dexmedetomidine also reduces the overall amount of analgesics needed in the first 24 hours after surgery and an increase in the time it takes to get initial rescue analgesia¹⁶. Furthermore, dexmedetomidine does not exhibit many of the adverse effects associated with opioids, including respiratory depression, nausea, vomiting, urinary retention, and pruritus^{17,18}. Additionally, the sympatholytic effect of dexmedetomidine can reduce the stress response to surgery, hence reducing hypertension and tachycardia^{19,20}.

Opioids cause elevated blood glucose level²¹. Dexmedetomidine has no effects on blood glucose level^{22,23}. Metabolic syndrome prevalence is 30% in Bangladesh, 20% in rest of the world²⁴. Dexmedetomidine has protective role on hepatic mechanism of action for blood glucose control in diabetic patient²⁵. Due to lack of context specific data in Bangladesh, we conducted this study to alleviate the possibility of metabolic syndrome

exaggeration, ensuring hepatic function protective mechanism along with desired post-operative analgesia with reduced side effects.

By improving postoperative analgesia facilitates the early mobilization of patients, which contributes the early recovery. From the clinical perspectives, Bangladesh has excessive patient burden in post-anaesthetic care unit²⁶. By improving the post-operative analgesia with the use of dexmedetomidine may reduce the patient burden in post-anaesthetic care unit. Therefore, this study aims to compare the analgesic effects, hemodynamic stability, and side effect profiles of dexmedetomidine versus fentanyl when used with bupivacaine in spinal anaesthesia.

Methods

This quasi-experimental study was conducted between 1 August, 2024, and 31st July, 2025 at Urology operation theatre supervised by Department of Anaesthesia, Analgesia & Intensive Care Medicine, Bangladesh medical university, Dhaka. Adult patients, either male or female, between the ages of 18 and 50, ASA physical status I and II undergone elective sub-umbilical urological surgery were selected for this study. Patient on anticoagulation medication or suffering coagulopathy, congenital sacral anomalies, infection at the sacrum, history of allergy to local anaesthetics, immunocompromised patients and patients suffering from any CNS malignancy were excluded from this study. The socio-demographic data and clinical data were collected and recorded in a structured data collection sheet. Patients were allocated in a 1:1 ratio to take either fentanyl or dexmedetomidine as an adjunct with bupivacaine. Group A (Control Group) - This group of patients received 1.8ml of hyperbaric bupivacaine 0.5% along with fentanyl (0.2ml=10mcg). Group B (Experimental Group) - This group of patients received 1.8ml of hyperbaric bupivacaine 0.5% along with (0.2ml=5mcg) dexmedetomidine.

Study procedure

Patients were kept nil per oral 6 hours before surgery and were shifted to Operation Theatre (OT) in the morning. IV cannulation was done. Lactated ringer's solution (10 ml/kg) was preloaded into the patients.

Patients were given Inj. Omeprazole 40mg & Inj. Ondansetron (8mg) & broad-spectrum antibiotic, intravenously.

The sitting position was used for the patients. The L3–L4 intervertebral gap was located while taking extreme aseptic care. Two millilitres of 1% lidocaine was injected into the skin.

After inserting a 25G Quincke's spinal needle into the intervertebral space, the free flow of CSF upon stylet removal indicates that the subarachnoid area had been reached.

The labeled syringe which contains the corresponding drug as per which study group the patient belonged to were attached to the needle, aspirated for CSF and then entire volume of drug was injected.

The pin-prick approach was used to assess the patient's sensory level while they are in a supine position. For the first 20 minutes, the level was checked every two minutes. The maximal sensory level was determined by taking the same data at two-minute intervals in a row. Sympathetic blockade was assessed by monitoring changes in blood pressure (hypotension), heart rate (bradycardia) & temperature sensation. Bromage scale (0 - able to lift legs, 1 - able to flex knees but not hips, 2 - unable to flex knees but can move ankle, and 3 - no movement in legs) was used to measure the degree of motor blockage. Until it reaches grade 3, it was checked every two minutes.

Heart rate, blood pressure, and SpO₂ were measured during the intraoperative period. The measures were checked every 5 minutes for the first 20 minutes of the procedure, and then every 10 minutes after that. The patients in post-operative period received analgesics when VAS score was equal or more than 4. The time from block to 1st analgesic request—an intravenous injection of Inj. Paracetamol (15 mg/kg) when the patient complains of pain were also tracked. Number of rescue analgesic (Inj. Pathedine, 1mg/kg IM) dosage was also recorded.

The total dosages of analgesics required throughout a 24-hour period were documented. Patients were monitored postoperatively for complications such as nausea (treated with injection ondansetron 0.1 mg/

kg intravenously), pruritus (treated with injection chlorpheniramine maleate 20mg intravenously), shivering, respiratory depression, hypotension (MAP fall > 20% treated with injection Ephedrine 1ml/5mg) and bradycardia. Bradycardia was managed by giving Atropine 0.6mg intravenously, hypotension was managed by IV fluid & vasopressor while nausea was managed by Inj Ondansetron(0.1mg/kg).

Statistical Analysis

Categorical variables like gender, ASA grade, pethidine use and side effects such as nausea, bradycardia and hypotension were measured in frequency and percentages. Duration of surgery, VAS at first analgesia required, duration of analgesia, hemodynamic variables such as SBP, DBP, MAP and HR, requirement of paracetamol, pethidine. VAS score at 6 hour, 12 hours and 24 hours were continuous variables. Normal distribution of continuous variables was checked. Only duration of analgesia and dose of pethidine were found in skewed distribution. The independent t-test was done to measure the differences of all continuous variables between both drug groups. Mann Whitney U test was done for duration of analgesia and dose of pethidine to find the differences within the individual drug group. Chi-square test was done for categorical variables. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 27.0 for Windows. Statistical significance was set at p<0.05 with confidence interval 95%.

Results

Total Patients who underwent spinal anaesthesia were evaluated to find out the effects and compare the analgesic efficacy, haemodynamic profile, and adverse effect profiles of dexmedetomidine compared to fentanyl as an adjunct to bupivacaine. During the study, fentanyl drug was labelled as group A and dexmedetomidine drug was labelled as group B. The sample size was 60 where dexmedetomidine and fentanyl both drug group had 30 patients each.

Table I showed the demographic characteristics of the studied groups. The mean age was slightly higher in fentanyl group 40.63 years than dexmedetomidine group 38.50 years. The age ranged from 26-50 years in dexmedetomidine group and 23-66 years in fentanyl

drug group. In case of gender, male patients were predominantly higher in both dexmedetomidine (76.7%) and Fentanyl drug groups (86.7%). ASA physical status I patient was found higher in dexmedetomidine study group (73.3%) than fentanyl study groups (66.7%).

Table I: Demographic characteristics of the studied groups (n = 60)

	Group A (n=30) Mean ± SD	Group B (n=30) Mean ± SD	p- value
Age group (Year)	40.63±10.19	38.50±7.12	0.35
(Minimum, Maximum)	(23, 66)	(26, 50)	
BMI (kg/m2)	21.21 ±3.24	22.99 ± 4.7	0.11
Gender	f (%)	f (%)	
Male	26 (86.7)	23 (76.7)	0.32
Female	4 (13.3)	7 (23.3)	
ASA Status			
Status I	20 (66.7)	22 (73.3)	0.57
Status II	10 (33.7)	8 (26.7)	

Values are expressed in arithmetic Mean ± SD and f values are expressed in absolute number, percentage (%), χ-chi-square test was used.

Table II demonstrated that 26.7%of group A patients had laser lithotripsy, followed by DJ stent removal and urethral stricture treatment (13.33% each). Diagnostic cystoscopy and shockwave lithotripsy were performed on three patients (10.0%). Equal numbers of patients (6.7%) underwent ureterolithotomy, excision of an epididymal cyst, alleviation of meatal stenosis, and treatment of penile stricture. The highest proportion of group B patients had laser lithotripsy and meatal stenosis alleviation (16.7%), followed by DJ stent removal (13.33%) and diagnostic cystoscopy (13.33%). Three patients (10.0%) underwent ureterolithotomy, urethral stricture relief, and penile stricture relief. Only two patients (6.7%) underwent shockwave lithotripsy and only one patient (3.3%) had excision of epididymal cyst.

Figure 1 showing duration of surgery was found higher in Dexmedetomidine group (50.73 minutes) than in the Fentanyl group (45.59 minutes). The independent

t test did not find any statistical significance in duration of surgery (p=0.37).

Table II: Distribution of the surgery based on allocated drug group (n=60)

Variables	Study group	
	Group A	Group B
	(n=30) f (%)	(n=30) f (%)
Relief of meatal stenosis	2 (6.7)	5 (16.7)
Laser lithotripsy	8 (26.7)	5 (16.7)
Shockwave lithotripsy	3 (10.0)	2 (6.7)
Relief of Penile stricture	2 (6.7)	3 (10.0)
Ureterolithotomy	2 (6.7)	3 (10.0)
Diagnostic cystoscopy	3 (10.0)	4 (13.33)
Removal of DJ stent	4 (13.33)	4 (13.33)
Relief of urethral stricture	4 (13.33)	3 (10.0)
Excision of epididymal cyst	2 (6.7)	1 (3.33)

Values are expressed in percentage (%)

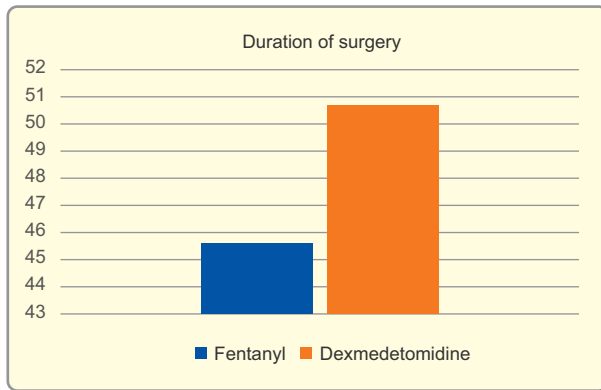


Figure 1: Duration of surgery between the two groups

The VAS score at first analgesia required was found higher in fentanyl drug group 3.87 than drug group dexmedetomidine 3.40. Independent t test was done and statistical significance was found in VAS score at first analgesia required between the drug groups (p= 0.002).

Figure 2 showed the difference of duration of analgesia between two groups. Drug dexmedetomidine has the duration of analgesia up to 258.33 minutes, which is higher than drug fentanyl 181.50 minutes. The median value for duration of analgesia was found higher in dexmedetomidine group

(235 minutes) than fentanyl group (180 minutes). Nonparametric Mann Whitney U test was done and statistical significance was found (p<0.001).

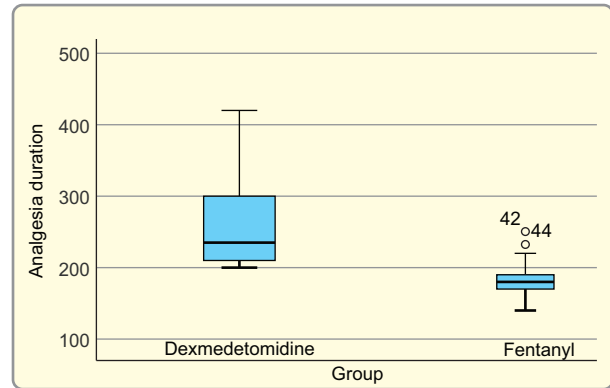


Figure 2: Duration of analgesia between two groups

All the VAS score at 6 hours, 12 hours and 24 hours was found higher in Fentanyl group than Dexmedetomidine group. Independent t test was done. The difference of VAS at the 6 hours between the two drug groups was found to be statistically significant (p<0.001). (Table III).

Table III: Post-operative analgesia using VAS score

VAS	Drug Group (Mean ± SD)		
	Group A (n=30)	Group B (n=30)	p- value
6 hours	3.87±0.35	3.33 ± 0.61	<0.001
12 hours	2.90±0.66	2.63±0.76	0.15
24 hours	2.57±0.56	2.33 ± 0.61	0.13

P value obtained from unpaired t test and values are expressed in Mean ± SD. p-value <0.05 considered as significant.

Patients of drug dexmedetomidine group needed lower paracetamol (1.62 gm) in post-operative period than drug fentanyl group (2.96 gm). Independent t test was done and statistical significance was found (p<0.001). The proportion of pethidine use in post-operative period was higher in fentanyl group (83.3%) than dexmedetomidine group (66.7%). The mean differences showed that fentanyl drug group patients needed higher dose of pethidine (75.00 ± 43.05 mg) than dexmedetomidine group (39.17 ± 31.95 mg). The median value showed that the requirement of pethidine was higher in fentanyl drug group (median value in 100) than dexmedetomidine group (median value 50). Non parametric Mann Whitney U test was done and statistical significance was found. (Table IV)

Table IV: Use of paracetamol and pethidine during post-operative period

Post-operative analgesic used	Mean ± SD t		p value
	Drug Group		
	Group A (n=30)	Group B (n=30)	
Dose of Paracetamol (gm)	2.96±0.18	1.62 ± 0.76	<0.001
Dose of Pethidine (mg)	75.00±43.05	39.17±31.95	
Median (IQR)	100 (50)	50 (50)	<0.001
	f (%)	f (%)	
Pethidine use	25 (83.3)	20 (66.7)	

Values are expressed in Mean ± SD. Statistical analysis was done by independent t test and. ä Statistical analysis was done by Mann Whitney U test and values are expressed in Median (IQR). p-value <0.05 considered as significant.

The table V compared the side effects of dexmedetomidine and fentanyl drug group. Proportion of nausea was found higher in Fentanyl group (26.7%) than dexmedetomidine group (3.3%). The chi square test was done and statistical significance was found (p<0.05). Bradycardia was found in equal proportion in both allocated drug without any statistical significance (p=1.0). The event of hypotension was found higher in Fentanyl group (33.3%) than dexmedetomidine group (17.8%). The chi square test was done and statistical significance was not found between the groups (p=0.14). Shivering was found higher in fentanyl group (23.3%) than dexmedetomidine group (10.0%). Pruritus was also found higher in fentanyl group (13.3%) where dexmedetomidine group did not have any complaints of pruritus. Chi-square test was found statistically insignificant for shivering (p=0.29) and pruritus (p=0.11).

Table V: Comparison of side effects between allocated drug group (n=60)

Outcome	Study group		p-value
	Group A (n=30)	Group B (n=30)	
Nausea	8 (26.7)	1 (3.3)	0.011
Bradycardia	1 (3.3)	1 (3.3)	1.00
Hypotension	10 (33.3)	5 (16.7)	0.14
Shivering	7 (23.3)	3 (10.0)	0.29
Pruritus	4 (13.3)	0 (0)	0.11

Values are expressed in absolute number, percentage (%) over column and statistical analysis was done by ÷ -chi-square test was used. p-value <0.05 considered as significant

Based on major and minor criteria of the adapted two-point scoring system, with an adjunct scoring of 9 or higher considered superior. The mean value of adapted two-point scoring system was found higher in group B

(9.83) than group A (8.10). This indicates that dexmedetomidine had better effects than fentanyl.

Discussion

In order to increase anesthetic depth and lower bupivacaine dosages, intrathecal adjuvants such as epinephrine, phenylephrine, adenosine, magnesium sulfate, fentanyl, dexmedetomidine, and clonidine are commonly used in conjunction with heavy bupivacaine (0.5%) for spinal anaesthesia²⁷. Dexmedetomidine has been widely utilized as an analgesic adjunct in various methods for postoperative pain relief, such as subarachnoid block techniques²⁸. Nonetheless, only a limited number of studies have utilized dexmedetomidine during urological procedures.

This quasi-experimental study was conducted to compare the analgesic efficacy, hemodynamic profile, and adverse effect profiles of dexmedetomidine & fentanyl. Adult patients aged 18-50 years with ASA physical statuses I and II undergoing surgery were included in the study. Our study assigned patients into two treatment arms: the control group received 1.8ml of hyperbaric bupivacaine 0.5% along with fentanyl containing (0.2ml=10mcg) while the intervention group received 1.8ml of hyperbaric bupivacaine 0.5% along with dexmedetomidine containing (0.2ml=5 µg).

Our study reveals, the post-operative VAS score was significantly lower in the dexmedetomidine group in comparison to the fentanyl group after 6 hours of postoperative period (p value <0.001). Rest of the postoperative period VAS score was low between the two groups but it became statistically insignificant (p value 0.13). Dexmedetomidine showed lower VAS at first analgesia required and prolonged duration of analgesia than fentanyl which was statistically significant (p value 0.002). The requirement of pethidine postoperatively was low in dexmedetomidine group which was highly significant (p value <0.001). Current study showed no requirement of pethidine in 93% & 16.7% population in dexmedetomidine & fentanyl group respectively. This difference was statistically significant (p value <0.001), which correlates with that done by Belgrami et al. (2022)²⁹. Ahmed et al., (2015)³⁰ stated that dexmedetomidine group showed a significantly longer time to first

analgesia request compared to fentanyl group. Notably, 75% of patients in dexmedetomidine group required no rescue analgesia, compared to 50% in fentanyl group. Similar findings were reported by Nayagam et al. (2014)³¹ who investigated the analgesic effects of 5 µg dexmedetomidine combined with bupivacaine compared to fentanyl alone in spinal anaesthesia for lower abdominal surgery. Likewise, the same outcome was shown by Gupta et al. (2011)²⁸ who discovered that the inclusion of intrathecal 5 µg dexmedetomidine as an adjuvant to bupivacaine in spinal analgesia positively impacted the duration of analgesia in comparison to fentanyl. Results of this study projected optimal analgesia with adequate level of both sensory & motor blockade which correlates with that done by Khosravi et al. (2020)⁶. Paravertebral block for renal surgery conducted by Elsharkawy et al. (2017)³² demonstrated similar analgesia like our study. Khosravi et al., (2020)⁶ stated that intrathecal dexmedetomidine administration enhances analgesia duration during spinal anaesthesia. Apart from urological surgery, similar result was obtained in lower limb surgery done by Saiyad et al. (2021)³³. Dexmedetomidine not only enhanced and prolonged sensory and motor blocks in spinal anaesthesia with bupivacaine but also prolongs the duration of anaesthesia.

Heart rates decreased in both groups, with dexmedetomidine patients consistently exhibiting lower rates. By 24 hours, the mean heart rates showed slight differences, but dexmedetomidine patients remained lower. Significant differences (p value=.04) were noted at 0 minutes, but subsequent comparisons revealed no statistical significance between the groups during the follow-up period. Elsharkawy et al. (2017)³² did not find any statistically significant reduction in intraoperative and postoperative heart rate between the two groups, except at the 2.5-hour mark, where the HR for the dexmedetomidine group was lower than fentanyl group (72.2 vs 79.3, p=0.03). Mahendru et al. (2013)³⁴ found comparable heart rate during intraoperative and post operative period. Fentanyl group showed lower heart rate than dexmedetomidine which contradicts to our study. Their study suggested,

after 120 minutes dexmedetomidine showed a little fluctuation than fentanyl. Saiyad et al. (2021)³³ did not find any significant differences of heart rate between two groups.

This study revealed, mean arterial blood pressure (MAP) increased in the fentanyl group initially for 6 hours, while dexmedetomidine had higher MAP at 12 hours. During intra-operative measurements, MAP changes did not differ significantly between the two groups. Elsharkawy et al. (2017)³² the alterations in mean arterial blood pressure were not statistically significant between the two groups except at 45 minutes and 1 hour, 2h and 2.5h during intra-operative assessments where it was reduced in dexmedetomidine group rather than fentanyl group. Gupta et al. (2011)²⁸ stated that both groups stayed hemodynamically stable MAP during surgery. Mahendru et al. (2013)³⁴ found comparable MAP throughout the intraoperative and postoperative phases. Both drug groups displayed comparable MAP, but after 100 minutes, the MAP of dexmedetomidine decreased below that of fentanyl. Saiyad et al. (2021)³³ did not find any significant differences of MAP between two groups.

Considering side effects, dexmedetomidine causes less side effects than fentanyl. Nausea was significantly found more in fentanyl group than dexmedetomidine. Hypotension was also found in higher proportion in fentanyl group than dexmedetomidine group, but difference was not statistically significant. Each drug had similar events of bradycardia. No patients had any pruritus in dexmedetomidine group but fentanyl group had pruritus in 13.3% cases. Shivering was more common in fentanyl group than dexmedetomidine (23.3% vs 10.0%). This finding correlates with other studies. Akhter et al. (2017)³⁵ only two patients from the dexmedetomidine group experienced bradycardia than control group. According to Gupta et al. (2011)²⁸ hypotension occurred more in the dexmedetomidine group than fentanyl, not statistically significant. Kuusniemi et al. (2000)⁹ found bradycardia on bupivacaine 10 mg with fentanyl 25 µg. They also found pruritus in 22.5% of individuals, as most frequent side effect of fentanyl. Shivering was also found in 10 % of cases. Mahendru et al., (2013)³⁴ treated only one patient with ondansetron in fentanyl

group for vomiting. One patient in group dexmedetomidine experienced bradycardia treated with atropine. No significant hypotension occurred. Belgrami et al. (2022)²⁹ found four patients with bradycardia comparing fentanyl and other group which was not statistically significant. Sun et al. (2017)³⁶ indicated that shivering, nausea, and vomiting were prevalent in fentanyl group. Elsharkawy et al. (2018)³² incidence of postoperative nausea was higher in dexmedetomidine group than fentanyl group. Elgebaly (2018)³⁷ also found a very few cases of shivering and pruritus in dexmedetomidine administration. So, use of dexmedetomidine is beneficial for patients undergoing urological surgeries.

Conclusion

Addition of dexmedetomidine with bupivacaine for urological surgeries under subarachnoid block resulted in superior analgesia for a longer duration without demand for additional analgesia & fewer side effects compared to fentanyl with bupivacaine.

Declaration

Ethics approval: The study was approved by the IRB, BMU (Reg.no.5281; BSMMU/2024/10991). Informed written consent was taken from the participants before inclusion.

Author contributions

Conception and development of the idea MSA, MSI
Writing MSA, SIM

Data analysis MSA, PS, MR, PD

Data collection SK, MAA, PS,

Review and Editing MSI

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