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Effectiveness of intra-articular dexmedetomidine as postoperative analgesia in arthroscopic knee surgery (A comparative study)

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ABSTRACT:

Background And Objectives: *To study the effect of inj.Ropivacaine (0.25%) 2mg/kg with and without Inj.Dexmedetomidine (1-2µg/kg) intraarticularly for postoperative analgesia in arthroscopic knee surgery.1:To Evaluate Onset, Duration and analgesic efficacy of Intraarticular Dexmedetomidine2: To monitor the safety of Dexmedetomidine and Ropivacaine.*

Methods: *A prospective randomized double blind study, was conducted in 50 patients undergoing elective arthroscopy of knee joint under spinal anaesthesia. At the completion of the surgery, all patients were divied into two groups;GroupP(n=25):received Inj. Ropivacaine 0.25% and GroupD(n=25):received Inj.Ropivacaine(0.25%)+Inj. Dexmedetomidine(1µg/kg) total volume 20 ml was deposited intra-articularly.Patients were monitored in the postoperative ward for the hemodynamic parameters and their Sedation score was assessed.. The efficacy of the drug was determined by improvement in VAS score, duration of analgesia and total number of rescue analgesics during 24 hr in post operative period.*

Results: *There was no statistically significant differences observed in heart rate except changes at 6 and 8 hr. At 6 and 8 hr in group P pulse (82.48 ± 7.49, 81.44 ± 8.78) as compared to group D (75.38 ± 6.52, 74.96 ± 5.70),because of duration of action of ropivacaine with or without dexmedetomidine.There was no statistically significant difference in blood pressure was found, except at 12 hour and 24 hour (p=0.018), because of longer duration of action of intrarticular dexmedetomidine with ropivacaine in group D.At 6 hrs patients in Group P had a mean VAS score of 3.2 as compared to VAS score values of 1.8 in Group D which is statistically significant..At 2 , 4, 6 and 8 hour VAS score in P group was 1.64, 2.44, 3.24, 2.84 respectively. As compared to group P, in group D VAS score at 2, 4, 6 and 8 hour was 0.92, 1.04, 1.79 and 2.08 respectively. So VAS score lower in group D as compared to group P at 2, 4, 6 and 8 hrs.*

Conclusion: *Dexmedetomidine when administered as an adjuvant to ropivacaine via intraarticular route produces longer duration of analgesia as compared to local anaesthetic drug alone resulting in lower pain scores and decreases need for postoperative analgesics with minimal side effects and no effect on hemodynamic parameters when used in low dose.Thus, intraarticular use of Inj.Dexmedetomidine is an effective adjuvant to ropivacaine for post operative analgesia following arthroscopy of the knee*

I. INTRODUCTION

In modern era of technological advancement in medical science, arthroscopic knee surgery is routinely performed on day care basis or as an office anaesthesia practice.[1, 37, 41]There are several methods and analgesic strategies for the control of post arthroscopic knee surgery pain. Ideal analgesic after knee arthroscopy surgery is still under review, research and needs further clinical trials due to limited evidences or resources.[37, 41]

In an effort to provide safe and effective analgesia , several studies were undertaken for its long lasting postoperative analgesia but some studies have questioned their efficacy.

There are researches continued for a simple method to provide postoperative pain relief because postoperative pain is obstacle for discharge & early rehabilitation[37].Several protocols e.g. nerve blocks-central and peripheral, intraarticular administration of various drugs (opioid and nonopioid analgesics) and systemic medications to control postoperative pain after arthroscopic knee surgery but difficult to find an ideal analgesic. Intraarticular administration of local anaesthetics (lidocaine, bupivacaine), opioids (morphine), alpha-2

adrenoceptor agonists (clonidine and magnesium sulphate)[4,7] have been tried alone or in combination to provide effective post operative analgesia but none of them were free from side effects and it might delay the discharge or might require readmission in the hospital[39]. Intraarticular bupivacaine is most preferred local anaesthetic with or without adjuvant for post arthroscopic pain relief. Ideal postoperative analgesic should have fast onset with suitable duration of action and quick regression of motor block to promote early mobilization, recovery and discharge from the hospital. Dexmedetomidine is highly selective alpha (α) 2 adrenergic agonist provide postperative analgesia after arthroscopy. Systemically it has sedative, anxiolytic, analgesic, anaesthetic sparing and sympatholytic effects[10, 41, 48, 51].

Ropoivacaine is new pure S (-) enantiomer, amino amide local anaesthetic agent, provides better sensory than motor block with minimal side effects and better cardiac stability than bupivacaine. Intraarticular dose recommended was 0.75%20ml (150mg).[9] Previous studies reports, dexmedetomidine as systemic administrator before regional anaesthesia provides better postoperative analgesia in arthroscopic knee surgery but with some adverse haemodynamic effects like bradycardia, hypotension, respiratory depression[6]. There is no much supporting literature available to support the effects of intraarticular dexmedetomidine with combination of ropivacaine on postoperative pain relief after knee arthroscopy, so we planned up this randomized double blind study in patients who posted for arthroscopic knee surgery under spinal anaesthesia to assess the analgesic effects

II. METHODS

A prospective randomized double blind study, **"Effectiveness of Intraarticular Dexmedetomidine as postoperative analgesia in arthroscopic knee surgery**" was conducted in total 50 patients undergoing elective arthroscopy of knee joint under spinal anaesthesia.

After institutional ethics commitee approval, written and informed consent was obtained from all the patients and their relatives. All patients were aged between 18 to 65 years, of either gender and belonging to ASA (American society of Anesthesiologists) physical status I, II and III. Patients with history of infection and malignant disease, cardiac disease (receiving beta-blockers, calcium channel blockers or α-methyldopa), coagulopathy, hepatic or kidney dysfunction, using any analgesics within 24hr period preceding the study or with previous history of allergic reactions any of the relevant drugs were excluded from the study. Detailed Preoperative history included any major illness, drug therapy, previous operation, allergy, anaesthesia or related to its complications etc. was noted on the day before surgery. Physical and systemic examination was carried out in detail. Routine laboratory investigations included Hemoglobin, Random Blood Sugar, Renal Function Test, serum electrolytes, chest X-ray and ECG were advised and reports recorded; specialized investigations were advised as per need.

All patients were explained the nature of study, procedure, mode of anesthesia, post operative pain relief that will be instillated and the patient's participation in evaluating the duration of post operative analgesia. All the patients were familiarized with the Visual Analogue Scale in their native language.

All Patients received oral Tab diazepam 5mg at night before operation. The patients were reassessed and reassured in the preoperative room. Preoperative monitoring included Baseline heart rate, Systolic and Diastolic blood pressure, peripheral oxygen saturation.After securing intravenous line, preloading done with Inj Ringer Lactate 10-15 ml/kg BW. All patients received premedication Inj. Ondansetron 75-100 mcg/kg IV 10 minutes prior to anesthesia procedure. Under all aseptic and antiseptic precautions, spinal anaesthesia was given with inj. bupivacaine 0.5% (heavy) 3-4ml in the sitting position using a 23-gauge Quincke spinal needle positioned at the L_2-L_3 or L_3-L_4 interspace. Patients were immediately turned to the supine position. Onset and level of sensory and motor block was recorded. Sensory level was checked after 2-3 mins with pin prick method and achieved between T_8 to T_{10} segment.The pneumatic thigh tourniquet was applied on the lower limb to be operated with inflation pressure 250-350 mm Hg continously during surgery. Intraoperative monitoring included Blood pressure, heart rate and oxygen saturation, $EtCO_2$, ECG, Respiratory rate at 15 minutes interval till completion of surgery.

At the completion of the surgery, all 50 patients were divied into two groups; Group P(n=25):received Inj. Ropivacaine 0.25% and Group D(n=25):received Inj. Ropivacaine(0.25%) + Inj. Dexmedetomidine (1µg/kg) total volume 20 ml was deposited intra-articularly in an aseptic manner by the operating surgeon throught the trocar. Torniquet was deflated after 10 minutes of intraarticulation of drug of either group.

Patients were monitored in the postoperative ward for Pulse, Respiratory rate, Temperature, Blood pressure(SBP, DBP,MAP), Sedation score assessed by Modified Wilson Score 1-5 and Pain assesment using Visual Analogue Scale (0= No Pain, 10 = Worst Possible Pain) upto 24 hr at interval of 2 hours. When VAS score was ≥ 4 ,the time was noted and rescue analgesia inj. Diclofenac sodium 75 mg IV was administered.Total duration of analgesia was calculated from the time of intra-articular deposition of the study drug to the first requirement of rescue analgesic. The efficacy of the drug was determined by improvement in VAS score, duration of analgesia and total number of rescue analgesics during 24 hr in post operative period. Recovery time from spinal anaesthesia, motor and sensory was noted. The patients were also monitored for complications related to drug or the procedure like hypotension, bradycardia, respiratory depression, convulsions, nausea, vomitting, paraesthesia etc, treated appropriately.All the postoperative observations were conducted by an observer blinded to the patient's group.

Statistical analysis was performed with unpaired Student's t-test between two groups. Statistically 'p' value <0.05 was considered significant.

III. RESULTS

Demographic data

The identical distribution of patients under both groups in terms of age and weights were comparable. There is a preponderance of male patients in our study.

The duration of anaesthesia and surgery in the both the groups, statistically significant between the groups, comparatively more in group D (176.25±31.04) and (154.38 ± 30.48), (p<0.05) respectively. Surgeon was constant factor but type of surgery varied.

We had more of ACL reconstructive surgeries in both the groups which was comparable between the groups.

Table RECOVERY FROM SPINAL ANAESTHESIA

GROUPS	RECOVERY FROM SPINAL ANAESTHESIA (MINUTES) (Mean±SD)	
	MOTOR	SENSORY
Group P	217.4 ± 20.97	233.80± 26.19
Group D	224.79 ± 18.02	248.75 ± 20.28
P Value	0.269(NS)	0.433(NS)

(P value<0.05 is considered significant.)(NS= Not Significant)

TABLE Post operative heart rate changes(pulse/minute)

Postoperative Time	Group P	Group D	P value (between the groups)
0 hr	79.76±8.15	80.48±6.80	0.667
2 hr	78.64 ± 8.06	77.42 ± 6.70	0.567
P value (in the group) group	0.63	0.14	
4 hr	79.48 ± 7.76	75.96 ± 6.45	0.091
P value (in the group)	0.90	**0.02****	
6 hr	82.48 ± 7.49	75.38 ± 6.52	**0.001****
P value (in the group)	0.23	**0.01****	
8 hr	81.44 ± 8.78	74.96 ± 5.70	**0.004****
P value (in the group)	0.49	**0.00****	
10 hr	79.12 ± 7.06	78.13 ± 7.72	0.640
P value (in the group)	0.77	0.27	
12 hr	79.28 ± 8.52	79.13 ± 6.63	0.944
P value (in the group)	0.84	0.51	
14 hr	80.08 ±7.71	77.54 ± 5.83	0.201
P value (in the group)	0.89	0.15	
16 hr	80.20 ± 8.88	76.88 ± 5.67	0.127
P value (in the group)	0.86	0.05	
18 hr	80.56 ± 8.98	77.25 ± 5.75	0.133
P value (in the group)	0.74	0.07	
20 hr	81.04 ± 8.51	79.00 ± 6.33	0.347
P value (in the group)	0.59	0.41	
22 hr	81.08 ± 8.04	79.92 ± 5.07	0.550
P value (in the group)	0.57	0.72	
24 hr	81.64 ± 7.10	79.71 ± 5.95	0.308
P value (in the group)	0.39	0.67	

(P value<0.05 is considered significant.)

Graph : Comparison of post operative heart rate between two groups

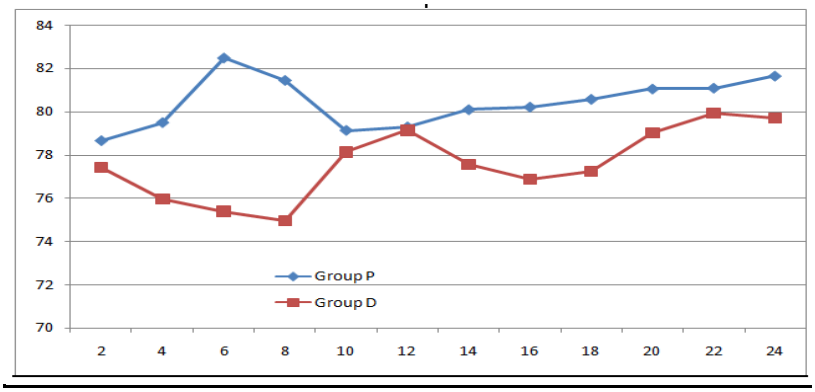


Table 5 and graph 2 show post-operative heart rate changes respectively in both groups at the different time intervals. There was no statistically significant differences observed except changes at 6 and 8 hr. At 6 and 8 hr in group P pulse (82.48 ± 7.49, 81.44 ± 8.78) as compared to group D (75.38 ± 6.52, 74.96 ± 5.70)(p= 0.001,p=0.004). Probably because of duration of action (intraarticular analgesia) of ropivacaine with or without dexmedetomidine. Within the groups from baseline there were pulse rate changes but there was no statistical difference observed, No bradycardia was observed.

Table :post operative systolic blood pressure changes

Postoperative Time	Group P	Group D	P Value(between the groups)
0 hr	122.88±9.20	126.40±9.97	0.799
2 hr	122.88 ± 7.24	123.25 ± 9.34	0.877
P value (in the group)	0.99	0.26	
4 hr	122.48 ± 8.69	122.08 ± 7.97	0.869
P value (in the group)	0.88	0.07	
6 hr	123.76 ± 8.51	122.17 ± 7.64	0.495
P value (in the group)	0.73	0.07	
8 hr	123.08 ± 7.33	123.58 ± 8.02	0.819
P value (in the group)	0.93	0.19	
10 hr	161.68 ± 199.0	127.67 ± 7.36	0.407
P value (in the group)	0.33	0.82	
12 hr	122.08 ± 8.42	127.58 ± 7.15	**0.018****
P value (in the group)	0.75	0.68	
14 hr	123.20 ± 7.1	124.5 ± 6.08	0.495
P value (in the group)	0.89	0.38	
16 hr	122.48 ± 8.07	123.92 ± 6.14	0.488
P value (in the group)	0.87	0.26	
18 hr	122.56 ± 8.0	124.33 ± 7.77	0.435
P value (in the group)	0.90	0.39	
20 hr	122.84 ± 9.47	127.42 ± 7.38	0.066
P value (in the group)	0.99	0.72	
22 hr	123.72 ± 9.43	128.38 ± 7.74	0.066
P value (in the group)	0.75	0.43	
24 hr	123.20 ± 8.41	128.92 ± 7.91	**0.018****
P value (in the group)	0.90	0.35	

(P value<0.05 is considered significant.)

Graph : post operative systolic blood pressure changes

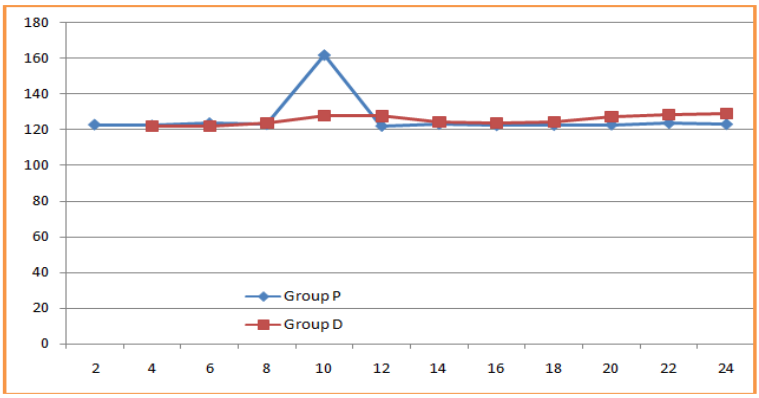


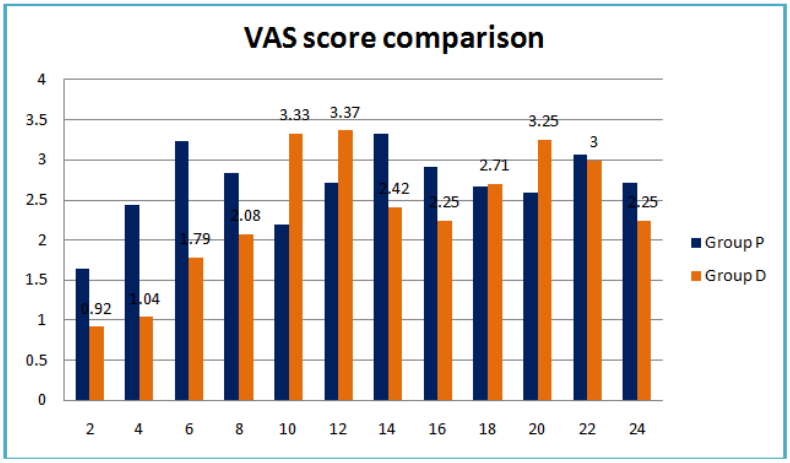
Table 6, graph 3;Post-operative systolic blood pressure changes respectively in both groups at different time intervals. There was no statistically significant difference was found, (p Value >0.05 in most of the observations) except at 12 hour and 24 hour (p=0.018). Probably because of longer duration of action of intrarticular dexmedetomidine with ropivacaine in group D.

Table :VAS score between two groups (Mean ± SD)

Postoperative Time	**Group P**	**Group D**	**p Value(between the groups)**
0 hr	0.20±0.41	0	**Not applicable**
2 hr	1.64 ± 0.86	0.92 ± 0.28	**0.0005****
4 hr	2.44 ± 1.04	1.04 ± 0.20	0.3866
P value (in the group)	**0.0001****	0.087	
6 hr	3.24 ± 0.93	1.79 ± 0.42	**P<0.0001****
P value (in the group)	**0.0001****	**0.0001****	
8 hr	2.84 ± 0.94	2.08 ± 0.28	**0.0002****
P value (in the group)	**0.0013****	**0.0001****	
10 hr	2.20 ± 0.58	3.33 ± 1.01	**0.0002****
P value (in the group)	**0.0037**	**0.0001**	
12 hr	2.72 ± 0.74	3.37 ± 0.88	**0.0082****
P value (in the group)	**0.0001****	**0.0001****	
14 hr	3.32 ± 0.80	2.42 ± 0.66	**0.0001****
P value (in the group)	**0.0001**	**0.0001**	
16 hr	2.92 ± 0.95	2.25 ± 0.44	**0.0037****
P value (in the group)	**0.0001****	**0.0001****	
18 hr	2.68 ± 1.03	2.71 ± 0.55	1.0000
P value (in the group)	**0.0001****	**0.0001****	
20 hr	2.60 ± 0.76	3.25 ± 0.79	**0.0065****
P value (in the group)	**0.0001****	**0.0001****	
22 hr	3.08 ± 0.86	3.00 ± 0.93	1.0000
P value (in the group)	**0.0001****	**0.0001****	
24 hr	2.72 ± 0.84	2.25 ± 0.53	**0.0366****
P value (in the group)	**0.0001****	**0.0001****	

(P value<0.05 is considered significant.)

Graph : VAS score between two groups



Above table 7 and graph 4 shows that post-operatively till 2 hrs none of the patient in both groups complained of pain. At 6 hrs patients in Group P had a mean VAS score of 3.2 as compared to VAS score values of 1.8 in Group D which is statistically significant. (p value <0.0001).At 2 , 4, 6 and 8 hour VAS score in P group was 1.64, 2.44, 3.24, 2.84 respectively. As compared to group P, in group D VAS score at 2, 4, 6 and 8 hour was 0.92, 1.04, 1.79 and 2.08 respectively. So VAS score lower in group D as compared to group P at 2, 4, 6 and 8 hrs.

Table : Duration of analgesia and no. of doses of rescue analgesics

	GROUP P	GROUP D	p Value
Duration of Analgesia(hrs)	6.40 ± 1.29	11.42 ± 1.25	**P<0.0001****
No. of doses of Rescue analgesics	2.68 ± 0.48	1.88 ± 0.34	**P<0.0001****

(P value<0.05 is considered significant.)

Graph : Duration of analgesia and no. of doses of rescue analgesics between two groups

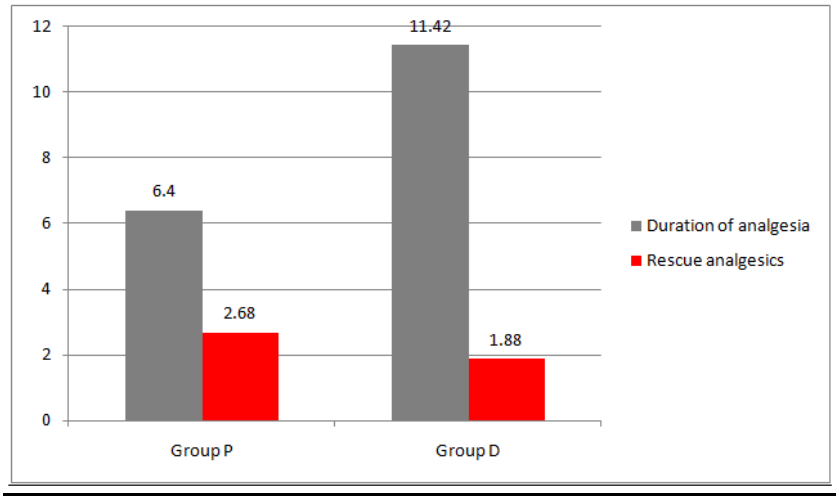


Table 8 & graph 5 shows the duration of analgesia was significantly longer in Group D (11.42±1.25hr) as compared to Group P (6.4±1.29hr). (P Value <0.0001) The requirement of rescue analgesics was significantly lower in Group D (1.88) as compared to Group P (2.68). (P Value <0.0001)

During post-operative period none of the patients in both groups had complains like nausea, vomiting, respiratory depression or convulsions. A patient from Group P and two patients from Group D experienced hypotension which was treated with IV fluids.

IV. DISCUSSION

In the current era of newer technical developments in the horizon of orthopedic surgeries, arthroscopic procedures of the knee are performed on the outpatient basis, so there can be failure to control postsurgical pain which can cause unnecessary suffering, delayed recovery, prolonged hospitalization and increased financial burden to the patient and hospital[13, 32]. The most feared aspect for a patient undergoing any surgery is most excruciating post surgical pain. In an attempt to approach post operative pain problem, anesthesiologist's have tried various evidence based modalities of postoperative pain management.

Good postoperative analgesic management brings most gratifying smile on the patient's face, in addition to other benefits like attenuation of the neuro-endocrine stress response, reduction of postoperative pulmonary and cardiac complications, an opportunity to institute early physiotherapy, early mobilization and put the patient on fast track mode. The knee arthroscopy patients require a highly effective peri-operative analgesic regimen with minimal side effects, intrinsically safe and can be easily managed away from the hospital or surgical center[13, 32].

Origin of the post-arthroscopic pain is a complex and is not fully understood. Various factors affecting the pain after arthroscopy and the effectiveness of intra articular analgesia contribute to the post operative pain following the arthroscopy include preoperative pain score, duration and type of surgery, seniority of surgeon, use of general or regional anesthesia, volume of the drug injected, addition of adrenaline, and timing of intraarticular injection. [30, **49**]

Dexmedetomidine is a centrally acting highly selective alpha-2 agonist that provides anxiolysis, sedation, sympatholysis, analgesia and anesthesia sparing effects without respiratory depression.[9, 24, 34, 41, 50] Many researchers have tried intraarticular dexmedetomidine found to be effective and promising adjuvant with LA for postoperative pain relief. The mechanism of intrarticular analgesic action of dexmedetomidine is not clearly understood, but it may be similar to clonidine. Clonidine act on alpha 2 adrenergic presynaptic receptor, and inhibits release of norepinephrine at peripheral afferent nociceptors, has local anesthetic effect through inhibition of nerve impulses through C and Aδ fibres, analgesic effect mediated via modulation of the opioid analgesic pathway and may stimulate the release of enkephalin like substance at peripheral sites.[24, 31, 41]Dexmedetomidine is highly selective alpha-2 adrenoceptor agonist which binds alpha 2 receptor up to eight times more than clonidine.[24] Peripheral analgesic effects of dexmedetomidine which enhances the LA effect are mediated by α 2A-AR binding. Direct intraarticular administration of dexmedetomidine 1mcg/kg as an adjuvant to LA, [9] enhances the postoperative analgesia and decreases the need of analgesics after arthroscopic knee surgery.[24, 41]

Intraarticular ropivacaine used as 75mg in 20 ml of saline solution provided no adverse reaction, safe, site specific, long-lasting anaesthetic drug with earlier onset, same duration of analgesia and VAS score had greater effect in first 4 postoperative periods ($p<0.01$) as compared to morphine. [14]

From other authors' observations, results and conclusions, it was observed that intraarticular route would be more effective in producing analgesia with lower doses of LA as compared to epidural or intravenous route. We decided to compare and evaluate the efficacy of Intra-articular Inj. Dexmedetomidine (1µg/kg) with Inj. ropivacaine for post operative pain relief following arthroscopy of the knee joint with other studies.

The demographic data like Age, Sex, Weight and ASA physical status grading were comparable in both groups; with a p value being statistically not significant for any group (Table 1). In an attempt to analyse the duration of analgesia the mean VAS score (Table 7, Graph 4) were recorded for each patient at 0hr, 2hr and then 2hrly upto 24 hr postoperatively till they required rescue analgesic at a VAS score of >4.

Our study included 50 patients, undergoing elective knee arthroscopy under spinal anaesthesia with bupivacaine heavy (15-20mg). Group P (n=25) received Inj Ropivacaine (0.25%) (19ml) and Inj.0.9% Normal saline (1ml) while Group D (n=25) received Inj Ropivacaine(0.25%)(19ml) and Inj.Dexmedetomidine (1µg/kg)(1ml), total volume 20 ml intraarticularly at the conclusion of arthroscopy.

Application of tourniquet and time of its removal may be related to duration of local action and rate of absorption of the LA drug from the joint. Volume of injected drug may increase the intraarticular pressure so it may facilitate systemic absorption once tourniquet is deflated. Considering this we kept tourniquet inflated for 10 minutes after intraarticular drug administration postoperatively.[31, 55]

In our study, pulse rate changes in Group-P and Group-D were statistically significant at 6hr (p=0.001) and 8 hr(p=0.004) between the groups and within the group in Group-D at 4hr (p=0.02),6hr (p=0.01) and 8hr (p=0.01). These changes may be related with the effect of shorter duration of intraarticular analgesic effect ropivacine VAS was higher as compared to ropivacaine with adjuvant dexmedetomidine.

Blood pressure changes were significant at 12 hr(p=0.018) and 24 hr(p=0.018) between the group P and D because of postoperative pain in most of patient due to longer duration of intraarticular effect of ropivacaine with dexmedetomidine as compared to intraarticular ropivacaine. Due to pain exagerated hyperadrenergic neuro humoral response leads to increase in pulse and blood pressure.

Postoperatively none of the patient in both group complained of pain till 2 hrs because of analgesic effect of spinal anesthesia. **The duration of surgery and recovery from spinal anesthesia in terms of motor and sensory block were comparable in both groups (Table 3 & Graph 1).** At 4 hrs in group P had a mean VAS Score of 2.44 while patients in group D were not having pain yet.

VAS Score at 6 hrs was statistically significant between group-P-3.24±0.93 while in in group- D-1.79±0.42 (p value<0.05).No. of patients received rescue analgesic at interval of 2 hr was much lower in group D than group P. At the end of 6 hr in group D none of the patients required rescue analgesic where in group P 13/25 patients required rescue analgesic. At 8 hr also none of patients received rescue analgesic in group D as compared to group P, 8/25 patients received rescues analgesics. (Table 9), the threshold for rescue analgesia was reached and almost 85% patients required first dose of rescue analgesic

Increased duration of analgesia shown with intraarticular use of dexmedetomidine with ropivacaine for postoperative analgesia following knee arthroscopy. [41] The mean duration of analgesia (Table 8, Graph 5) was longer in group D(11.42 ± 1.25hr) as compared to group P(6.40 ± 1.29) (p<0.01). While in another study, Duration of analgesia was longer inintraarticular ropivacaine and dexmedetomidine (10.84 ± 2.6 hours) as compared intraarticular ropivacaine. (5.38± 1.4hours) (p<0.0001) While analyzing results of both group, patients of grroup R had a mean VAS Score of 2.84 at 8 hrs postoperatively (Table 7, Graph 4). Almost all the patients in group R required rescue analgesia within 8hrs. The mean duration of analgesia in this group was 6.40 hrs. However at 8 hrs the mean VAS Score in group was 2.09. Patients in group D had the mean duration of analgesia was11.42 hrs. Thus the patients who received dexmedetomidine as an adjuvant to ropivacaine had longer duration of analgesia and lower pain scores as compared to patients who received ropivacaine alone. No. of rescue analgesic dose were were lower in Group D (1.88 ± 0.34) as compared to Group R (2.68 ± 0.48) (p<0.01)

Postoperative mental status was observed using Modified Wilson score for sedation. The patients in Group-D developed sedation but were easily arousable. Sedative effect of dexmedetomidine is dose dependant. In our study, dexmedetomidine was used in optimal low dose, so incidence of sedation was very less.

In view of side effects (Table 9) of Dexmedetomidine one patient (4%) in group R and two patients (8%) Group-D developed hypotension which was treated with IV fluids. None of the patients developed bradycardia, convulsions or respiratory depression.

A limitation of our study is that we did not measure the plasma concentration of dexmedetomidine to correlate it with the clinical findings, which may have confirmed the local effects.

A reduction in pain and joint-swelling may accelerate the recovery of muscle strength and reduce the duration of convalescence following arthroscopic meniscectomy. The present study has shown that low dose of intraarticular dexmedetomidine (1µg/kg) along with Inj. Ropivacaine (0.25%) is efficient for pain relief. Intraarticular Inj. Dexmedetomidine is an efficient adjuvant to Inj. Ropivacaine following knee arthroscopy. Also that none of the patients had any significant side effects.

In conclusion,

Dexmedetomidine when administered as an adjuvant to ropivacaine via intraarticular route

1. Produces significantly longer duration of analgesia as compared to local anaesthetic drug alone.
2. Results in lower pain scores and increased time to first analgesic request,
3. Decreases need for postoperative analgesics,
4. Minimal side effects and no effect on hemodynamic parameters when used in low dose.

Thus, intraarticular use of Inj.Dexmedetomidine is an effective adjuvant to ropivacaine for post operative analgesia following arthroscopy of the knee joint.

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