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To compare the effect of intraperitoneal instillation of ropivacaine 0.75% 10ml, and ropivacaine with dexmedetomidine 1mcg/kg for post-operative analgesia after laparoscopic cholecystectomy

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Abstract
Background: To compare the effect of intraperitoneal instillation of ropivacaine 0.75% 10 ml, and ropivacaine with dexmedetomidine 1mcg/kg for post-operative analgesia after laparoscopic cholecystectomy
Materials and Methods: This is a prospective, randomised study conducted out on 100 patients of either sex, aged 18-60 years, ASA grade I and II scheduled for laparoscopic cholecystectomy.
Results: Intra-peritoneal instillation of 0.75%ropivacaine with dexmedetomidine provides superior and prolonged pain relief without any adverse effects, making its use simple, safe and effective for postoperative analgesia in laparoscopic cholecystectomy. All the results were significant statistically and have correlated well with the studies in reference.
Conclusion: we concluded that dexmedetomidine 1µg/kg can be used as adjuvant to 0.75% ropivacaine for effective post-operative analgesia in laparoscopic cholecystectomy. Intra-peritoneal instillation of 0.75%ropivacaine with dexmedetomidine provides superior and prolonged pain relief without any adverse effects, making its use simple, safe and effective for postoperative analgesia in laparoscopic cholecystectomy. Hence, we concluded that use of dexmedetomidine as additive to ropivacaine for intra-peritoneal instillation and port site infiltration in patients posted for elective laparoscopic cholecystectomy, as it significantly prolongs duration of analgesia along with minimal side effects as compared to infiltration with ropivacaine alone.

Keywords: Ropivacaine, laparoscopic cholecystectomy, dexmedetomidine

Introduction
Cholecystectomy is the surgical removal of gallbladder. Cholecystectomy is one of the most common operative procedures performed in field of general surgery. Indications for cholecystectomy include gallstones, gall bladder cancer, biliary colic and other gall bladder conditions. Cholecystectomy can be done by open surgical approach or laparoscopic approach. In present days, laparoscopic cholecystectomy is preferred over open cholecystectomy due to facts such as minimally invasive procedure, achieve cosmetic results, reduce complications like haemorrhage, relatively fast recovery, reduce hospital stay, less prone to post- operative infections, less severity of pain, minimizes use of(or) dependence on post-operative oral analgesics. Open cholecystectomy is opted only in presence of absolute contraindication for laparoscopic approach. The first Laparoscopic Cholecystectomy evolved at France in 1987 [1]. Though laparoscopic procedure has laid a platform for pain-free era, it doesn't mean that exactly. Laparoscopic cholecystectomy is not only the treatment of choice for cholelithiasis and other gall bladder diseases, but also considered as a gold standard intervention replacing the conventional open surgical method of cholecystectomy. Laparoscopic Cholecystectomy also causes post-operative pain but minimal in nature compared to open cholecystectomy. Pain is defined as "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage" by International Association for the Study of Pain (IASP) [2]. Post- operative pain is a barrier to early post-op ambulation. Therefore, post- operative pain management remains as a great challenge to anaesthetist. Pain after surgical procedures is due to peritoneal inflammation from tissue trauma caused by surgical incision and dissections, nerve injuries

caused by transaction, stretching, or compression. Pain occurs as a result of stretching of the intra-abdominal cavity, diaphragmatic irritation (action of residual in CO_2 in peritoneal cavity), gas insufflation and raised intra peritoneal pressure. The pain following laparoscopic and open cholecystectomy is visceral and parietal/somatic respectively. Parietal pain is sharp and can be localized by specific spot or point. Visceral pain is dull, non- localised, occurs when the nerves through the walls of an organ are stretched. If irritation of parietal peritoneum occurs, visceral pain may lead to somatic/ parietal pain. The intensity of pain following open cholecystectomy is higher than pain following laparoscopic cholecystectomy. Uncontrolled post-operative pain causes venous thrombo-embolism, it may lead to chronic regional pain syndromes. Several literatures illustrate multiple modes and approaches to overcome the pain. Use of Non-Steroidal Anti-Inflammatory Drugs (NSAIDS)/Parentral analgesics/Opiods, local anaesthetic instillation, alpha 2 agonists have marked a tremendous change in pain management. The advantage of using local anesthetics is that, it provides adequate analgesia without drastic complications. Instillation of local anestheticin to peritoneal cavity, blocks visceral afferent signaling and modifies visceral nociception and illness responses. Nociception is a neural process of detection of painful stimuli / encoding noxious stimuli by specialised peripheral sensory neurons (nociceptors) in dorsal root ganglia. The peripheral terminals of these sensonry neurons (nociceptors) are transducers converting thermal, mechanical and chemical energy at site of stimulus to electrical activity which is conducted through dorsal horn of CNS. Ropivacaine is considered as classical example of local anesthetic with anaesthetic and analgesic effect. Ropivacaine is a safest Food and Drug Administration (FDA) approved long acting amino- amide local anaesthic [3]. The salient features are less lipophilic, less cardio and neuro-toxic, low probability of penetrating large myelinated motor fibres and tolerable. It causes reversible inhibition of sodium ion influx and blocks propagation of action channels. Previous literatures suggest that, ropivacaine use significantly reduces the frequency, intensity of post-operative pain and improves patient satisfaction. The absolute contraindication to ropivacaineis in patients with a known hypersensitivity to ropivacaine or any other amide-local anesthetic. Certain available studies quotes that, dexmedetomidine an alpha 2 agonist acts as an adjuvant and has asynergistic effect with ropivacaine. It intensifies the motor blockage, prolongs duration of analgesia, and causes sedation without markable respiratory depression. It blocks substance P in the nociceptive pathway and acts on inhibitory G protein, thereby it increases the conductance through potassium channels. The backbone of intraperitoneal local analgesic instillation is “preemptive analgesia” which refers that previously administered medications modulate the arousal of nociception action in the post-operative period sparing pain-after analgesics. The preemptive analgesia prevents the formation of central sensitization to painful stimuli by decreasing response from pain sensation. Therefore, in view of above issues, a study was conducted to evaluate and compare thepost-operative analgesic effect of intra-peritoneal instillation of ropivacaine 0.75% alone and ropivacaine with dexmedetomidine 1mcg/kg after laparoscopic cholecystectomy.

Materials and Methods

Study design: Randomised study.
Sample size: 100 patients.
Sample size calculation: Sample size was calculated using software Epi InfoTM [7], with the assumption of alpha error to be 5% and beta error to be 20% i.e. 95% confidence interval and 80% power of study. Assumption of exposed group taken to be 95% with 10% margin of error. Thus, a sample size of 120 patients was taken with 60 patients in each group.
Subjects & selection method: All participants were randomly divided into two groups (Group R and Group RD) by a computer-generated randomization table.
Group R: Patients received Intra-peritoneal instillation of 0.75%ropivacaine 10ml + 5ml normal saline intra operatively for post operative analgesia.
Group RD: Patients received Intra-peritoneal instillation of 0.75% ropivacaine 10ml + dexmedetomidine 1µg/kg making the volume 5 ml with normal saline intra operatively for post operative analgesia.

Inclusion Criteria

1. Patient consenting for the study.
2. Patients with age 18-60 years
3. ASA grade I/II with no known drug allergy.

Exclusion Criteria

1. Patients undergoing emergency surgery
2. Patients allergic to any drugs.
3. History of alcohol and drug abuse
4. Patient refusal.
5. Pregnancy, cardiovascular, hematological, neurological, respiratory disease

Technique Methodology

Patients who were allotted to R group received 10ml of 0.75% ropivacaine intraperitoneally Group RD received 10 ml 0.75% ropivacine with dexmedetomidine 1mcg/kg body weight intraperitoneally after putting them under general anaesthesia Study drug was instilled after removal of gallbladder. At the end of pneumoperitoneum, Heart rate, SBP, DBP, MAP, respiratory rate, Spo2, ETCO2 values were recorded. After extubation patient was shifted to recovery room. Time to recovery was recorded. Complications were noted intraoperatively and post operatively. Time of onset of pain.Rescue analgesia: Injection diclofenac was given.

Data Recording

The following parameters were assessed Postoperatively, heart rate, Spo2, Blood Pressure, pain score, sedation at baseline, ½, 1, 2,4,6,12,24 hours .Other recordings were duration of analgesia, total number of doses and total amount of rescue analgesia given in 24 hrs, shoulder pain and any other complication.

Statistical Analysis

Data was presented as mean, standard deviation, median (range), or percentage, as appropriate. Study data was entered into the SPSS software (version 21, SPSS) and was analysed with the chi-square test for qualitative and student t-test for quantitative variables, between the trial and control groups, P values less than 0.05 was considered significant.

Results

Table 1A: Comparison of Mean Age of Patients

(Mean±SD)	Group R (n=50)	Group RD (n=50)	p-value	Significance
Age in years	40.78±11.45	38.26±12.2	0.29	NS

Statistical analysis shows no significant difference in average age among the two groups. (p value > 0.05)

Table 1B: Age Group Distribution

Age group	Group R		Group RD	
	N	%	N	%
18-20 years	2	4	2	4
21-30 years	11	22	15	30
31-40 years	14	28	10	20
41-50 years	11	22	13	26
51-60 years	12	24	10	20
Total	50	100	50	100

Chi square value=1.63 P=0.80 NS

Table 2: Comparison of Gender Distribution of Patients

Gender	Group R (n=50)	%	Group RD (n=50)	%	p-value
Male	7	14	10	20	0.48
Female	43	86	40	80	0.48
Total	50	100	50	100	

Chi square value=0.50 P=0.48 NS

In group R there were 7 (14%) males and 43 (86%) females. Group RD had 10 (20%) males and 40 (80%) females. statistical analysis shows no significant difference in average taken for gender distribution among two groups. (p value > 0.05)

Table 3: Comparison of Mean Weight of Patients

Weight (Kg)	Group R (n=50)	Group RD (n=50)	p-value	Significance
(Mean ± SD)	55.2±6.12	55.8±5.29	0.60	NS

Both the two groups were comparable in terms of mean weight (p-value >0.05).

Table 4: Comparison of Post-Operative Mean Heart Rate (HR) in Two Groups (MEAN±SD)

Study period (hours)	Pulse Rate (BPM) (MEAN±SD)		p-value	Significance
	Group R (n=50)	Group RD (n=50)		
Baseline	82.56±9.35	85±9.94	0.209	NS
0	85.7±8.16	88.76±10.01	0.097	NS
0.5	84.24±8.29	86±12.53	0.411	NS
1	83.26±8.78	84.78±9.82	0.417	NS
2	81.66±7.63	84.08±9.54	0.165	NS
4	82.92±8.19	82.94±9.8	0.991	NS
6	86.92±8.95	82.88±10.41	0.04	NS
12	79.86±9.08	82.54±9.69	0.157	NS
24	79.52±9.35	82.42±9.75	0.132	NS

Baseline heart rate was comparable in the two groups, *p*> 0.05 (unpaired t test). There was no significant difference in the mean heart rate between the two groups at any time interval (*p*> 0.05)

Table 5: Comparison of Post-Operative Mean SBP (mm Hg) in Two Groups (MEAN±SD)

Study period (hours)	MEAN SBP (mmHg) (MEAN±SD)		p-value	Significance
	Group R (n=50)	Group RD (n=50)		
Baseline	127.18±9.48	128.16±11.27	0.639	NS
0	134.22±8.35	132.22±9.33	0.261	NS
0.5	129.04±10.35	125.9±10.21	0.13	NS
1	124.8±9.42	124.78±11.33	0.992	NS
2	123.92±8.51	125.58±11.18	0.408	NS
4	122.72±8.87	125.04±10.81	0.244	NS
6	121.42±8.49	123.96±11.7	0.217	NS
12	121.80±7.76	125.10±10.87	0.12	NS
24	122.7±7.35	125.10±10.93	0.26	NS

At all time intervals, the p-value was> 0.05 (unpaired t test) and hence the difference in the SBP between the two groups were insignificant.

Table 6: Comparison of Post-Operative Mean DBP (mm Hg) in Two Groups (MEAN±SD)

Study period (hours)	MEAN DBP (mmHg) (MEAN±SD)		p-value	Significance
	Group R (n=50)	Group RD (n=50)		
Baseline	79.56±5.68	78.86±7.09	0.587	NS
0	82.8±6.61	81.54±5.96	0.319	NS
0.5	79.68±5.33	77.36±6.7	0.058	NS
1	78.48±6.01	76.8±8.87	0.27	NS
2	78.22±5.97	77.46±8.57	0.608	NS
4	77.6±6.12	78.36±6.38	0.545	NS
6	77.34±5.82	76.46±8.39	0.544	NS
12	75.64±6.1	78.06±5.86	0.046	NS
24	75.46±6.34	78.16±6.59	0.04	NS

At all time intervals, the p-value was > 0.05 (unpaired t test) and hence on intergroup comparison the difference in the DBP between the two groups were insignificant.

Table 7: Comparison of Post-Operative Map (mm Hg) in Two Groups (MEAN±SD)

Study period (hours)	MAP (mm Hg) (MEAN±SD)		p-value	Significance
	Group R (n=50)	Group RD (n=50)		
Baseline	95.18±6.19	96.12±6.57	0.464	NS
0	100.6±9.86	98.5±5.63	0.3	NS
0.5	96.06±6.55	94.82±6.41	0.342	NS
1	93.94±7.46	93.82±8.98	0.942	NS
2	94.74±6.15	93.98±8.37	0.606	NS
4	93.66±5.93	94.5±6.55	0.503	NS
6	93.02±6.71	92.86±8.85	0.919	NS
12	92.48±5.32	94.12±7.24	0.2	NS
24	93.62±5.7	94.14±7.4	0.695	NS

At all time intervals, the p-value was > 0.05 (unpaired t test) and hence on intergroup comparison, the difference in the MAP between the two groups was insignificant.

Table 8: Comparison of Post-Operative Mean SpO2 in Two Groups (MEAN±SD)

Study period (hours)	Mean SpO2 (Mean±SD)		p-value	Significance
	Group R (n=50)	Group RD (n=50)		
Baseline	99.92±0.4	99.98±0.14	0.315	NS
0	99.84±0.51	99.7±0.65	0.232	NS
0.5	99.72±0.64	99.78±0.59	0.654	NS
1	99.92±0.34	99.82±0.48	0.234	NS
2	99.74±0.56	99.84±0.55	0.371	NS
4	99.94±0.31	99.88±0.44	0.431	NS
6	99.84±0.47	99.78±0.58	0.571	NS
12	99.96±0.28	99.96±0.2	1	NS
24	99.86±0.45	99.94±0.31	0.307	NS

At all time intervals, the p-value was> 0.05 (unpaired t test) and hence the difference in the SpO2 between the two groups was insignificant.

Table 9: Comparison of Mean Duration of Analgesia in Two Groups (MEAN±SD)

	Group R (n=50)	Group RD (n=50)	p-value	Significance
Duration of Analgesia (min)	522.6±65.98	748.2±91.87	<0.0001	HS

The mean duration of analgesia was 525.80±66.64 min in group R with a range of 360 to 620 min. In group RD, the mean duration of analgesia was 746.60±93.78 min with a range of 510 to 845 min. The difference in the mean duration of analgesia was statistically highly significant (p< 0.05).

Table 10: Comparison of Post-Operative Mean Pain Score (VAS) in Two Groups (MEAN±SD)

Time interval (hours)	Mean Vas Score (MEAN±SD)		p-value	Significance
	Group R (n=50)	Group RD (n=50)		
0	0±0	0±0		
0.5	1.44±0.54	0.3±0.46	<0.001	HS
1	2.02±0.51	0.66±0.56	<0.001	HS
2	2.48±0.5	1.34±0.63	<0.001	HS
4	2.94±0.24	1.9±0.36	<0.001	HS
6	3.02±0.25	2.08±0.4	<0.001	HS
12	2.54±0.71	2.18±0.8	0.019	HS
24	3.5±0.54	2.02±0.38	<0.001	HS

Mean VAS scores were lesser in group RD than in group R at all the time intervals and were statistically highly significant (p< 0.05).

Table 11: Number of Doses of Rescue Analgesic Required in Two Groups (in 24 Hours)

	Group R (n=50)		Group RD (n=50)		p-value	Significance
Number of Doses	No. of patients (n)	%	No. of patients (n)	%		
One	6	12%	44	88%	<0.0001	HS
Two	37	74%	6	12%	<0.0001	HS
Three	7	14%	0	0	<0.0001	HS
Mean±SD Dose	2.02±0.51		1.12±0.33		<0.0001	

The total number of doses of rescue analgesic required was lesser in group RD as compared to Group R. In Group R 10 patients (25%) required 3 doses of rescue analgesic, whereas none of the patients required 3 doses of rescue analgesic in Group RD. In Group R, 2 doses were required in 25patients (62.50%), 1 dose in 5 patients (12.50%). In Group RD, 5 patients (12.50%) required 2 doses and 35(87.50%) patients required only one dose of rescue analgesic.

Table 12: Mean Amount (mg) of Rescue Analgesic Required in Two Groups (in 24 Hours)

	Group R MEAN±SD (n=50)	Group RD MEAN±SD (n=50)	p-value	Significance
Mean amount (mg) of rescue analgesic	151.5±38.6	84.0±24.62	<0.0001	HS

The mean total rescue analgesic consumption was low in group RD (84.0±24.62) as compared to Group R (151.5±38.6), and was statistically highly significant (p< 0.05).

Table 13: Comparison of Shoulder Pain

Shoulder pain	Group R (n=50)		Group RD (n=50)	
	n	%	n	%
	3	6	0	0

Chi square value=3.09 P=0.078 NS

Shoulder pain was complained by two patients in Group R (5%) as compared to none of the patients in Group RD.

Table 14: Comparison of Adverse Effects

	Group R (n=50)		Group RD (n=50)		p-value	Significance
	n	%	n	%		
PONV	3	7.5	1	2.5	*Chi square value = 1.89 P*= 0.16	NS
Hypotension	0	0	0	0	-	-
Bradycardia	0	0	0	0	-	-
Pruritus	0	0	0	0	-	-

The PONV was observed in 3 patients (7.5%) in Group R compared to 01(2.5%) in group RD. (p-value>0.05). There was no incidence of bradycardia, hypotension and pruritus in the two groups.

Table 15: Comparison of Sedation Score (RSS) in Two Groups

Time interval (hours)	Mean RSS Score (MEAN±SD)		p-value	Significance
	Group R (n=50)	Group RD (n=50)		
0	2±0.45	2.14±0.57	0.177	NS
0.5	1.84±0.37	1.9±0.3	0.377	NS
1	1.84±0.37	1.9±0.3	0.377	NS
2	1.82±0.39	1.88±0.33	0.406	NS
4	1.8±0.4	1.88±0.33	0.28	NS
6	1.72±0.45	1.84±0.37	0.15	NS

Mean sedation score in postoperative period was found to be less than 2at all time interval, also on intergroup comparison the difference in the RSS between the two groups were observed to be statistically insignificant(p-value> 0.05) (Unpaired t test)

Discussion

The present study is a randomised controlled trial conducted among 100 patients to evaluate the efficacy of Ropivacaine and dexmedetomidine over Ropivacaine alone. Participants were divided in to two categories. Group R – Ropivacaine alone, Group RD - Ropivacaine and dexmedetomidine. Demographic characters are as follows Age: Mean age in group R is 40.78±11.45 and in Group RD is 38.26±12.2. Statistical analysis shows no significant difference in average age among the two groups. (P> 0.05) Sex: In group R there were 7 (14%) males and 41 (82%) females. Group RD had 10 (20%) males and 40 (80%) females. Statistical analysis shows no significant difference in average taken for gender distribution among two groups (p value > 0.05) Weight: Both the groups were comparable in terms of mean weight with group R having 55.2±6.12 and group RD having 55.8±5.29 (p-value >0.05). Haemodynamic parameters: Baseline heart rate (BPM) was comparable in the two groups; 82.56±9.35 for Group R and 85±9.94 for group RD; p> 0.05 (unpaired t test). There was no significant difference in the mean heart rate between the two groups at any time interval (p> 0.05). At all time intervals, the p-value was > 0.05 (unpaired t test) and hence the difference in the SBP, DBP, MAP and SPO2 between the two groups was insignificant. Duration of analgesia: The mean duration of analgesia was 525.80±66.64 min in group R with a range of 360 to 620 min. In group RD, the mean duration of analgesia was 746.60±93.78 min with a range of 510 to 845 min. The difference in the mean duration of analgesia was statistically highly significant (p< 0.05). VAS Score: At 0.5 hours, Group R had a mean VAS of 1.44±0.54, while Group RD showed 0.3±0.46. The mean VAS at 1 hour; Group R showed 2.02±0.51, whereas Group RD showed 0.66±0.56. At 24 hours Group R and RD showed VAS of 3.5±0.54 and 2.02±0.38 respectively. The mean VAS scores were lesser in group RD than in group R at all the time intervals and were statistically highly significant (p< 0.05). Yeh CN *et al* [22] (2014) found that combined wound and intraperitoneal local anaesthetic after laparoscopic cholecystectomy significantly decreased the immediate postoperative pain. Shrinivas Rapolu *et al* [23] (2016) compared the analgesic effect of intraperitoneal instillation of dexmedetomidine with 0.25% bupivacaine (125 mg) 50ml v/s 0.25% bupivacaine (125mg) 50ml alone. There was statistically significant difference in VAS pain score at 6, 8, 12, 18, 24 hours after surgery in group BD (3.21±0.83) compared to group B (2.81±0.91) up to 24 hours. Time to requirement of first dose rescue analgesia for group BD was 7.61 hours compared to 5.81 hours for group. Dr. Hitesh Kumar S. Patel *et al.* [25] (2016) also showed a statistically significant difference in VAS at six hours after surgery in group BD (3.14±0.40) compared to group B (4.12±0.82) up to 24 hours. In another study, Gopal Reddy Narra *et al*24 (2016) showed results that post-operative VAS pain scores were significantly lower in levobupivacaine 0.25% (39.58%) when compared to ropivacaine (52.08%). Neha T Das *et al.* [27] (2017) also did a study showing intraperitoneal infiltration of LA significantly reduces pain intensity score in early postoperative period and helps in improving the postoperative recovery after laparoscopic cholecystectomy. Rescue analgesia: The total number of doses of rescue analgesic required was lesser in group RD (1.12±0.33) as compared to Group R (2.02±0.51). In Group R, 10 patients (25%) required 3 doses of rescue analgesic, whereas none of the patients required 3 doses of rescue analgesic in Group RD. In Group R 2 doses were required in 25patients (62.50%), 1 dose in 5 patients (12.50%). In Group RD, 5 patients (12.50%) required 2 doses and 35(87.50%) patients required only one dose of rescue analgesic. Total rescue analgesia: The mean total rescue analgesic consumption was low in group RD (84.0mg±24.62) as compared to Group R(151.5mg±38.6), with a p value of 0.0001 and was statistically highly significant (p< 0.05). Narasimhan *et al.* (2017) [26] showed similar results that intraperitoneal instillation of dexmedetomidine in combination with bupivacaine in elective laparoscopic cholecystectomy was more effective as an analgesic compared to bupivacaine alone or in combination with tramadol. Shoulder pain: Shoulder pain was complained by two patients in Group R (5%) as compared to none of the patients in Group RD. Shivhare P *et al.* [20] (2014) did a randomized double blind study showing that intraperitoneal instillation of ropivacaine reduces the incidence and intensity of upper abdominal pain and shoulder tip pain after laparoscopic cholecystectomy. A Singh *et al.* [10] (2013) concluded that ropivacaine with fentanyl reduces not only the intensity of visceral, parietal and shoulder pain but also the total rescue analgesic dose consumption. Postoperative complications: The post-operative nausea and vomiting was observed in 3 patients (7.5%) in Group R compared to one (2.5%) in group RD (p-value >0.05). There was no incidence of bradycardia, hypotension and pruritus in the two groups. Chhavi S Sharma *et al.* [21] (2014) did a randomized prospective double blinded study concluding that intraperitoneal analgesia with local anaesthetic (ropivacaine and

bupivacaine) is simple, effective method with minimal side effects. Sedation score: The mean sedation scores at 1 hour were 1.84±0.37 and 1.9±0.3 for Group R and Group RD respectively. Mean sedation score (RSS) in postoperative period was found to be less than 2 at all time intervals; Also, on intergroup comparison the difference in the RSS between the two groups were observed to be statistically insignificant(p-value> 0.05) (Unpaired t test)

Conclusion

From our study we concluded that dexmedetomidine 1µg/kg can be used as adjuvant to 0.75% ropivacaine for effective post-operative analgesia in laparoscopic cholecystectomy. Intra-peritoneal instillation of 0.75%ropivacaine with dexmedetomidine provides superior and prolonged pain relief without any adverse effects, making its use simple, safe and effective for postoperative analgesia in laparoscopic cholecystectomy. We recommend the use of dexmedetomidine as additive to ropivacaine for intra-peritoneal instillation and port site infiltration in patients posted for elective laparoscopic cholecystectomy, as it significantly prolongs duration of analgesia along with minimal side effects.

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