EFFICACY OF USG GUIDED SINGLE SHOT BILATERAL ERECTOR SPINAE PLANE BLOCK WITH DEXMEDETOMIDINE AS AN ADJUVANT TO ROPIVACAINE IN PATIENT UNDERGOING OFFPUMP CABG

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KEYWORDS

DEXMEDETOMIDINE, ROPIVACAINE, CABG

ABSTRACT

Introduction: Coronary artery bypass grafting (CABG) is a popular surgical procedure for coronary artery disease, but its popularity has declined due to alternative treatments. The erector spinae plane (ESP) block, a local anesthesia technique, is a promising alternative for pain management. The study evaluates the effectiveness of USG-guided ESP blocks with dexmedetomidine in off-pump CABG patients, aiming to improve pain management and reduce opioid consumption. **Aims:** The study evaluates the efficacy of bilateral single shot erector spinae plane block with dexmedetomidine as an adjuvant to ropivacaine in adult cardiac surgical patients. **Methodology:** A prospective, randomized controlled study at Krishna Institute of Medical Sciences in Karad, Maharashtra, aimed to detect an estimated difference in postoperative fentanyl consumption between patients undergoing cardiac surgery. The study involved 60 adult patients aged 18-60 years and elective cardiac surgical patients undergoing CABG (off pump). The study included a comprehensive hemogram, random blood sugar, blood urea, serum creatinine, electrocardiogram, chest Xray, and coagulation profile. **Results:** The study compared the age, ASA status, heights, weight, surgery duration, heart rates, SpO2 levels, MAP values, systolic blood pressure, DBP values, and VAS scores of ER and ERD treatment groups. Results showed no significant differences, suggesting comparable respiratory stability and oxygenation efficacy. The ER group reported lower pain levels at 2 hours, while the ERD group required rescue analgesia later. The most common adverse events were bradycardia, hypotension, and vomiting among both groups combined. **Discussion:** The study found that dexmedetomidine and ropivacaine combined effectively for pain management, but their advantages diminished over time, despite maintaining similar oxygen saturation levels and respiratory stability. **Conclusion:** The study showcases the efficacy of ultrasound-guided bilateral ESP with ropivacaine plus dexmed in cardiac surgical procedures, reducing rescue analgesia and opioid consumption.

INTRODUCTION

Coronary artery bypass grafting (CABG) is a major surgical procedure that bypasses atheromatous blockages in coronary arteries, improving function and alleviating symptoms. Despite its popularity, trends have declined due to alternative treatments like medical therapy and PCI. [1]

Coronary artery bypass grafting (CABG) is a key treatment for coronary artery disease, with off-pump techniques reducing complications. Postoperative pain management is crucial, and regional anesthesia techniques offer effective analgesia while minimizing opioid use.

Regional anesthesia is crucial for pain management after surgical procedures, with the erector spinae plane (ESP) block emerging as a promising alternative. This technique uses local anesthetics to provide sensory blockade with minimal motor involvement, enhancing accuracy and safety.[2]

Erector spinae plane block (ESPB) is a simple, safe, and effective method for postoperative pain control and recovery. Recent research suggests dexmedetomidine may extend pain relief duration across various procedures. ESPB is used for chronic pain, acute post-traumatic pain, and high-risk surgical candidates. [3-5]

Adjuvants like Dexmedetomidine, a selective α2-adrenergic agonist, have shown potential benefits in prolonging analgesic duration and improving postoperative outcomes in regional blocks. [6]

Erector spinae fascial plane blocks show promise in reducing postoperative pain, reducing opioid usage, prolonging recovery time, and reducing intensive care unit stays in off-pump coronary artery bypass surgery patients. [7]

Limited research on ESP blocks and dexmedetomidine's combined efficacy in off-pump CABG patients is needed, given unique challenges and pain management requirements, highlighting the need for rigorous investigation.

The study evaluates the effectiveness of USG-guided ESP blocks with dexmedetomidine in off-pump CABG patients, assessing postoperative pain, opioid consumption, hemodynamic stability, adverse events, and patient satisfaction, contributing to perioperative pain management strategies.

This study investigates the effectiveness of ultrasound-guided single-shot bilateral erector spinae plane (ESP) block with dexmedetomidine as an adjuvant to ropivacaine in off-pump coronary artery bypass grafting (CABG) patients. It aims to improve pain management and reduce opioid consumption, and optimize analgesic efficacy while minimizing adverse effects. The study contributes to refining anesthesia protocols for cardiac surgeries, potentially improving patient outcomes and postoperative recovery.

AIM & OBJECTIVES

The study aims to assess the effectiveness of bilateral single shot erector spinae plane block with dexmedetomidine as an adjuvant to ropivacaine in adult cardiac surgical patients.

The study evaluates the efficacy of bilateral single shot Erector Spinae Plane Block with ropivacaine and dexmedetomidine, compares safety, and studies associated complications.

MATERIALS & METHODS

The study was a prospective, randomized controlled study conducted at Krishna Institute of Medical Sciences' Department of Cardiac Anesthesiology in Karad, Maharashtra, using computer-generated random numbers.

This study was conducted at Krishna Institute of Medical Sciences, Karad, Maharashtra, for 18 months, involving patients with written informed consent and following inclusion and exclusion criteria.

INCLUSION CRITERIA: The inclusion criteria include adult patients aged 18-60 years and elective cardiac surgical patients undergoing CABG (off pump).
EXCLUSION CRITERIA : Patients undergoing ON PUMP CABG elective or intraoperatively, with local infection, disordered anatomy, coagulopathies, weight over 100kg or BMI over 35, arrhythmias, or allergic reactions to ropivacaine and dexmedetomidine.

The study aims to detect an estimated difference in postoperative fentanyl consumption between the study and control group with a standard deviation of ±60µg for a α value of 0.05 and power of 80%. The sample size is 16 in each group, but 30 are planned to be included due to the dropout rate and feasibility of including more patients.

PROCEDURE:

The procedure involves a pre-anesthesia check-up, including a physical examination and systemic examination, with patients given written informed consent and a tablet of alprazolam orally two hours before surgery. Blocks are performed before general anesthesia, with the patient in an upright position to allow rib spaces to spread. An echo plex needle is advanced to visualize the muscles, and a 20 ml bolus of local anesthetic ropivacaine 0.375% is injected. Patients are then subjected to standard anesthesia protocols and the surgical procedure.

The study involved a comprehensive hemogram, random blood sugar, blood urea and serum creatinine, electrocardiogram, chest Xray, and coagulation profile. Post-operatively, patients were studied for demographic data, duration of analgesics, associated complications, postoperative variables, and rescue analgesic usage.

The study involved 60 adult patients who underwent elective cardiac surgeries over an 18-month period. They were divided into two groups: Group A, which received a bilateral ESP block with 20 ml of plain ropivacaine 0.375%, and Group B, which received ropivacaine 0.375% with dexmedetomidine 0.5 µg/kg. Patients were educated about the procedure, and baseline readings were recorded. The surgery was performed in both groups. Preliminary data were recorded and analyzed using Microsoft Excel 2007 and SPSS 22.0 software. Statistical analysis included categorical factors, continuous variables, and unpaired Student's t-test, Fisher's exact test, Mann-Whitney test, univariate analysis of variance, and generalized linear models.

OBSERVATION & RESULTS

Table 1: Table showing age distribution of subjects by group

Age group	Group		Total
	ER	ERD	

40-50 years	**N**	**13**	**12**	**25**
	Percent	**43.3%**	**40%**	**41.7%**
51-60 years	**N**	**17**	**18**	**35**
	Percent	**56.7%**	**60%**	**58.3%**
Total	**N**	**30**	**30**	**60**
	Percent	**100%**	**100%**	**100%**
Chi square (p value)		**0.069 (0.793)**		

The table displays the age distribution of ER and ERD treatment groups, showing comparable age distributions.

Table 2: Table showing ASA status of subjects by group

ASA status		**Group**		**Total**
		ER	**ERD**	
I	**N**	**13**	**12**	**25**
	Percent	**43.3%**	**40.0%**	**41.7%**
II	**N**	**17**	**18**	**35**
	Percent	**56.7%**	**60.0%**	**58.3%**
Total	**N**	**30**	**30**	**60**
	Percent	**100.0%**	**100.0%**	**100.0%**
Chi square (p value)		**0.069 (0.793)**		

The table displays the ASA status distribution between ER and ERD treatment groups, showing a comparable distribution between the two groups.

Table 3: Table showing mean height of subjects by group

	Group	**N**	**Mean**	**Std. Deviation**	**t test**	**p value**
Height	**ER**	**30**	**160.30**	**5.17**	**1.120**	**.267**
	ERD	**30**	**158.87**	**4.74**		

The table compares heights between ER and ROPI+DEXMED treatment groups, with no significant difference observed between the two groups, as indicated by a t-test.

Table 4: Table showing mean weight of subjects by group

	Group	N	Mean	Std. Deviation	t test	p value
Weight	ER	30	57.57	9.17	-.637	.527
	ERD	30	58.83	5.88		

The table compares weight between ER and ERD treatment groups, showing no significant difference in weight between the two groups, with a mean weight of 57.57 kg and a standard deviation of 9.17.

Table 5: Table showing mean duration of the surgery (in min) of subjects by group

	Group	N	Mean	Std. Deviation	t test	p value
Duration of the surgery (min)	ER	30	108.93	11.74	.693	.491
	ERD	30	107.07	8.94		

The table compares surgery duration between ER and ERD treatment groups, with ER having a mean of 108.93 minutes and ERD having a mean of 107.07 minutes, showing no significant difference.

Table 6: Table showing comparison of mean heart rate at different points by group

Heart Rate	Group	N	Mean	Std. Deviation	t test	p value
0 hr	ER	30	92.53	9.47	1.846	.070
	ERD	30	87.97	9.69		
2 hr	ER	30	82.40	13.44	2.779	.007
	ERD	30	74.17	9.10		
4 hr	ER	30	84.67	7.00	.369	.713
	ERD	30	84.00	6.98		
6 hr	ER	30	84.57	8.42	2.215	.031
	ERD	30	79.63	8.83		
8 hr	ER	30	92.20	9.37	2.071	.043

	ERD	**30**	**87.13**	**9.58**		
12 hr	**ER**	**30**	**82.53**	**12.56**	**2.916**	**.005**
	ERD	**30**	**74.27**	**9.13**		
24 hr	**ER**	**30**	**84.40**	**6.83**	**.142**	**.887**
	ERD	**30**	**84.13**	**7.68**		
48 hr	**ER**	**30**	**83.83**	**6.52**	**2.394**	**.020**
	ERD	**30**	**79.30**	**8.06**		
72 hr	**ER**	**30**	**80.63**	**12.79**	**-.138**	**.891**
	ERD	**30**	**81.07**	**11.55**		

The table compares heart rates at various time points between ER and ERD treatment groups. At 2 hours post-treatment, the ER group had a significantly higher mean heart rate than the ERD group. However, no significant differences were found at other time points.

Table 7: Table showing comparison of mean SPO2 at different points by group

SPO2	Group	N	Mean	Std. Deviation	t test	p value
0 hr	**ER**	**30**	**98.53**	**1.14**	**1.345**	**.184**
	ERD	**30**	**98.13**	**1.17**		
2 hr	**ER**	**30**	**98.43**	**1.07**	**-.489**	**.627**
	ERD	**30**	**98.57**	**1.04**		
4 hr	**ER**	**30**	**98.93**	**1.08**	**1.816**	**.075**
	ERD	**30**	**98.40**	**1.19**		
6 hr	**ER**	**30**	**98.47**	**1.07**	**-.336**	**.738**

	ERD	**30**	**98.57**	**1.22**		
8 hr	**ER**	**30**	**98.30**	**1.12**	**.117**	**.907**
	ERD	**30**	**98.27**	**1.08**		
12 hr	**ER**	**30**	**98.53**	**1.14**	**1.111**	**.271**
	ERD	**30**	**98.20**	**1.19**		
24 hr	**ER**	**30**	**98.47**	**1.11**	**.122**	**.903**
	ERD	**30**	**98.43**	**1.01**		
48 hr	**ER**	**30**	**98.87**	**1.07**	**1.266**	**.211**
	ERD	**30**	**98.50**	**1.17**		
72 hr	**ER**	**30**	**98.33**	**1.09**	**-.445**	**.658**
	ERD	**30**	**98.47**	**1.22**		

The table compares SpO2 levels between ER and ERD treatment groups at various time points, showing no significant differences. Both treatments maintained similar oxygen saturation levels, indicating comparable respiratory stability and oxygenation efficacy.

Table 8: Table showing comparison of mean atrial pressure at different points by group

MAP	Group	N	Mean	Std. Deviation	t test	p value
0 hr	**ER**	**30**	**89.83**	**3.83**	**-.525**	**.602**
	ERD	**30**	**90.37**	**4.04**		
2 hr	**ER**	**30**	**77.70**	**14.47**	**-.071**	**.943**
	ERD	**30**	**77.97**	**14.46**		

4 hr	**ER**	**30**	**90.10**	**4.41**	**.836**	**.406**
	ERD	**30**	**88.87**	**6.77**		
6 hr	**ER**	**29**	**89.97**	**5.23**	**.287**	**.775**
	ERD	**30**	**89.53**	**6.27**		
8 hr	**ER**	**30**	**80.57**	**13.35**	**-.108**	**.915**
	ERD	**30**	**80.90**	**10.47**		
12 hr	**ER**	**30**	**90.37**	**4.93**	**.077**	**.939**
	ERD	**30**	**90.27**	**5.13**		
24 hr	**ER**	**30**	**90.43**	**4.45**	**.347**	**.730**
	ERD	**30**	**89.83**	**8.37**		
48 hr	**ER**	**30**	**75.63**	**14.47**	**-1.288**	**.203**
	ERD	**30**	**80.33**	**13.79**		
72 hr	**ER**	**30**	**78.60**	**13.71**	**-1.352**	**.182**
	ERD	**30**	**83.20**	**12.63**		

The table compares Mean Arterial Pressure (MAP) values between ER and ERD treatment groups at various time points, showing no significant differences, indicating comparable hemodynamic stability between the two groups.

Table 9: Table showing comparison of mean systolic blood pressure at different points by group

Systolic BP	Group	N	Mean	Std. Deviation	t test	p value
0 hr	**ER**	**30**	**119.23**	**8.00**	**-.288**	**.774**
	ERD	**30**	**119.83**	**8.13**		

2 hr	**ER**	**30**	**87.17**	**8.03**	**1.003**	**.320**
	ERD	**30**	**85.40**	**5.33**		
4 hr	**ER**	**30**	**105.83**	**17.15**	**5.335**	**.000**
	ERD	**30**	**88.33**	**5.36**		
6 hr	**ER**	**30**	**140.17**	**183.93**	**.849**	**.400**
	ERD	**30**	**111.60**	**13.06**		
8 hr	**ER**	**30**	**108.43**	**16.39**	**-1.031**	**.307**
	ERD	**30**	**112.43**	**13.53**		
12 hr	**ER**	**30**	**115.10**	**15.81**	**.622**	**.536**
	ERD	**30**	**112.90**	**11.17**		
24 hr	**ER**	**30**	**113.30**	**12.92**	**-.384**	**.703**
	ERD	**30**	**114.40**	**8.94**		
48 hr	**ER**	**30**	**111.20**	**8.60**	**-1.202**	**.234**
	ERD	**30**	**114.40**	**11.77**		
72 hr	**ER**	**30**	**112.67**	**10.37**	**-.910**	**.367**
	ERD	**30**	**115.13**	**10.64**		

The table compares systolic blood pressure (SBP) values between ER and ERD treatment groups. At 4 hours post-treatment, the ER group had a significantly higher mean SBP of 105.83 mmHg compared to the ERD group of 88.33 mmHg. No significant differences were found at other time points.

Table 10: Table showing comparison of mean diastolic blood pressure at different points by group

Diastolic BP	Group	N	Mean	Std. Deviation	t test	p value
0 hr	ER	30	74.60	5.26	-.216	.829
	ERD	29	74.97	7.55		
2 hr	ER	30	60.03	7.18	2.957	.004
	ERD	30	55.03	5.85		
4 hr	ER	30	64.07	12.22	2.087	.041
	ERD	30	58.87	6.08		
6 hr	ER	30	63.47	11.26	-1.892	.064
	ERD	30	69.07	11.66		
8 hr	ER	30	64.27	14.06	-1.506	.137
	ERD	30	69.50	12.82		
12 hr	ER	30	64.67	12.74	-.669	.506
	ERD	30	66.90	13.12		
24 hr	ER	30	65.40	10.12	-.579	.565
	ERD	30	67.13	12.91		
48 hr	ER	30	66.00	9.13	-1.393	.169
	ERD	30	69.60	10.82		
72 hr	ER	30	65.97	9.28	-1.430	.158

The table compares diastolic blood pressure (DBP) values between ER and ERD treatment groups at various time points. Significant differences were observed at 2 hours and 4 hours post-treatment, with the ER group having a higher mean DBP at 2 hours and 64.07 mmHg at 4 hours. However, no significant differences were found at other time points, suggesting general comparability for the remainder of the observation period.

Table 11: Table showing comparison of mean VAS at different points by group

VAS	Group	N	Mean	Std. Deviation	t test	p value
0 hr	ER	30	7.80	1.10	.377	.707
	ERD	30	7.70	0.95		
2 hr	ER	30	1.60	0.67	-2.530	.014
	ERD	30	2.13	0.94		
4 hr	ER	30	1.50	0.51	-3.084	.003
	ERD	30	2.07	0.87		
6 hr	ER	30	1.50	0.51	-3.153	.003
	ERD	29	2.07	0.84		
8 hr	ER	30	1.53	0.51	-4.062	.000
	ERD	29	2.45	1.12		
12 hr	ER	30	1.67	0.55	-10.741	.000
	ERD	29	5.76	2.01		
24 hr	ER	30	2.30	0.92	-.976	.333
	ERD	30	2.53	0.94		
48 hr	ER	30	5.03	1.71	1.392	.169
	ERD	30	4.40	1.81		
72 hr	ER	29	6.31	1.17	-.194	.847
	ERD	30	6.37	1.07		

The study compared the Visual Analog Scale (VAS) scores of ER and ERD treatment groups at different time points. Results showed significant differences in VAS scores at different time points, with the ER group reporting lower pain levels at 2 hours and ERD group at 4 hours, 6 hours, 8 hours, and 12 hours post-treatment. No significant differences were found at 0 hours, 24 hours, 48 hours, and 72 hours. The initial pain relief benefit of ER may diminish over time.

Table 12: Table showing comparison of fentanyl consumption (ug) by group

	Group	N	Mean	Std. Deviation	t test	p value
fentanyl consumption(ug)	**ER**	**30**	**134.38**	**53.6**	**5.3995 df=58**	**< 0.00001**
	ERD	**30**	**70.56**	**36.6**		

The table compares fentanyl consumption between ER and ERD treatment groups. The ER group consumed 134.38 µg, while the ERD group consumed 70.56 µg. A statistically significant difference was found, indicating lower fentanyl consumption in the ERD group.

Table 13: Table showing comparison of Time of rescue analgesia consumption by group

	Group	N	Mean	Std. Deviation	t test	p value
Time of rescue analgesia	**ER**	**30**	**3.53**	**0.81**	**6.230**	**.000**
	ERD	**30**	**5.20**	**1.22**		

The study compared the time to rescue analgesia between the ER and ERD treatment groups, finding a significant difference. The ERD group required rescue analgesia significantly later, suggesting potentially longer-lasting analgesic effects with ERD compared to the ER group.

Table 14: Table showing adverse effects among subjects by group

Adverse events		**Group**			**Total**
		ER	ERD	P	
Total	No adverse event	13.00	22.00		35.00
	Percent	43.33	73.33	0.0352	58.33
Bradycardia	N	3.00	7.00		10.00
	Percent	10.00	23.33		0.12
Bradycardia+,Hypotension	N	1.00	0.00		1.00
	Percent	3.33	0.00		0.02
Drowsiness	N	0.00	1.00		1.00

	Percent	0.00	3.33		0.02
Hypotension	N	6.00	0.00	0.0237	6.00
	Percent	0.20	0.00		0.10
Shivering	N	3.00	0.00		3.00
	Percent	0.10	0.00		0.05
Vomiting	N	4.00	0.00		4.00
	Percent	13.33	0.00		0.07
Total	N	30.00	30.00		60.00
	Percent	1.00	1.00		1.00

The study categorized adverse events into ER and ERD treatment groups. In the ER group, 43.3% experienced no adverse events, while the ERD group had no adverse events. The most common adverse events were bradycardia (11.7%), hypotension (10.0%), and vomiting (6.7%) among both groups combined.

Discussion:

The study found that the ER group had a higher mean heart rate at 2 hours post-treatment compared to the ERD group, which was consistent with the known pharmacological effects of dexmedetomidine, an alpha-2 adrenergic agonist. Dexmedetomidine's effects are most pronounced in the early phases of administration and gradually stabilize, indicating its utility in clinical settings where a reduced heart rate is desired. The transient nature of the heart rate difference underscores the need for close monitoring of vital signs to manage potential hemodynamic fluctuations effectively. [49]

The study found no significant differences in SpO2 levels between the ER (ESP+ROPI) and ERD (ESP+ROPI+DEXMED) groups, indicating that both treatments maintained similar oxygen saturation levels and respiratory stability. This aligns with existing literature highlighting the respiratory safety of dexmedetomidine and ropivacaine when used appropriately. Dexmedetomidine, known for its sedative and analgesic properties, does not significantly affect respiratory parameters. The combination of dexmedetomidine and ropivacaine enhances analgesia without compromising respiratory function. This confirms the use of dexmedetomidine and ropivacaine in combination for effective and stable patient outcomes. [8]

The study found no significant differences in mean arterial pressure (MAP) between the ER and ERD groups, indicating both treatments maintained similar MAP levels and hemodynamic stability. This aligns with existing literature on the cardiovascular effects of dexmedetomidine and ropivacaine. [9]

Ropivacaine, a local anesthetic, has minimal systemic effects in regional anesthesia. Combining it with dexmedetomidine enhances analgesic efficacy while maintaining cardiovascular stability. Both anesthetics maintain cardiovascular stability, ensuring patient safety. Dexmedetomidine's

safety and efficacy in postoperative pain management are supported by the lack of significant differences in MAP. [10]

The study found a significant difference in systolic blood pressure (SBP) at 4 hours post-treatment, with the ER group experiencing a higher mean SBP of 105.83 mmHg compared to the ERD group of 88.33 mmHg. This difference aligns with the known effects of dexmedetomidine, an alpha-2 adrenergic agonist that initially causes peripheral vasoconstriction, leading to a transient hypertensive response followed by a more prolonged hypotensive effect due to central sympatholysis and decreased norepinephrine release. The study suggests that while dexmedetomidine causes an early, transient drop in SBP, it does not lead to prolonged hypotension, making the ROPI+DEXMED combination a safe and effective option for pain management. [11,12]

The study found significant differences in diastolic blood pressure (DBP) between the ER (ESP+ROPI) and ERD (ESP+ROPI+DEXMED) groups at 2 and 4 hours post-treatment. The ER group showed higher DBP levels, suggesting dexmedetomidine may have an early hypotensive effect. This aligns with the known pharmacological profile of dexmedetomidine, an alpha-2 adrenergic agonist that reduces sympathetic tone, leading to vasodilation and lower blood pressure. However, as the body adjusts, DBP levels return to baseline, maintaining overall cardiovascular stability during the perioperative period. Anticipating and managing this transient hypotensive effect is crucial for the ROPI+DEXMED combination.

The study found that the ESP+ROPI group reported lower pain levels post-treatment compared to the ROPI+DEXMED group during early hours. However, these differences diminished over time, suggesting that while the ESP+ROPI combination provides superior early pain relief, the advantage diminishes as time progresses. The analgesic efficacy of dexmedetomidine and its combination with ropivacaine is supported by recent literature. The higher VAS scores in the ROPI+DEXMED group may be due to the pharmacokinetics of dexmedetomidine, which slows down the onset of its analgesic effects. The study emphasizes the importance of considering the timing and onset of analgesic effects when using dexmedetomidine as an adjunct. [13,14]

The study found no significant difference in fentanyl consumption between the ER (ESP+ROPI) and ERD (ESP+ROPI+DEXMED) groups, suggesting ERD provided better analgesia and less fentanyl requirement. This aligns with previous studies showing that regional anesthetic combinations do not significantly impact intraoperative opioid requirements. Both groups provide sufficient analgesia without significantly altering opioid requirements. [15]

The study found that the ERD group needed rescue analgesia later than the ER group, with mean times of 5.20 hours and 3.53 hours, respectively. This aligns with previous research showing that regional blocks using ropivacaine with adjuncts can extend postoperative analgesia. The prolonged time to rescue analgesia in the ER group may be due to the synergistic effects of ropivacaine and ESP block technique. [16]

The study emphasizes the importance of tailoring anesthetic regimens to individual patient profiles to minimize adverse events. The ER group experienced higher incidences of bradycardia and hypotension, while the ERD group showed a lower rate of adverse events. Careful selection and monitoring of anesthetic combinations is crucial for optimizing patient outcomes and minimizing adverse effects. [17]

Conclusion

The study demonstrates the effectiveness of ultrasound-guided single shot bilateral ESP with ropivacaine plus dexmed (ERD) group in cardiac surgical procedures, reducing rescue analgesia requirements and opioid consumption. The ERD technique is simple, effective, and safer due to easy visualization of sonographic targets and a distant injection site from major vascular structures. This adds to existing literature on ESPB application in cardiac surgery.

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