Paravertebral block in cardiac surgery: effect on respiratory function in patients undergoing mammary artery grafting via thoracotomy

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Background and study objectives

Is paravertebral anesthesia safe and effective when used in cardiac surgery?
✓Thoracotomy is considered the most painful surgical procedures
✓Does ultrasound-guided paravertebral anesthesia provide better pain control in the early postoperative period versus general anesthesia?
✓Does thoracic paravertebral block appear to preserve lung function and reduce rate complications?

Material

Subjects:
30 patients undergoing mammary artery grafting via thoracotomy
Group **PVB** -15 patients who received ultrasound-guided paravertebral block in combination with sevoflurane anesthesia
Group **GA** – 15 patients who received sevoflurane-fentanyl based general anesthesia

Methods

Ultrasound-guided paravertebral block:
➤injection of 0,4 ml/kg 0,5% ropivacaine covering Th4 – Th9 dermatome levels before of the induction of general anesthesia
Pulmonary function was assessed before surgery and on the second postoperative day
Pain was assessed with the visual analog scale both at rest and during stimulated cough after surgery and on the second day post-surgery

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Results

➤Pulmonary function significantly decreases after thoracotomy in cardiac surgery
➤Paravertebral block appears to preserve lung function
➤Preservation of pulmonary function is associated with better pain control and effective cough after surgery
➤Paravertebral block results in good hemodynamic stability in patients having cardiac surgery

Conclusion

Ultrasound-guided paravertebral block appears to be an effective and safe regional anesthesia technique that could reduce the risk of complications and improve outcomes in patients undergoing cardiac surgery

Results – pain control

	PVB (n=15)	GA (n=15)	T
Pain – first hours after surgery	1± 1,3	6,3 ± 1,63	P ≤ 0,01
Pain – 1 st day at rest (NRS, scores)	2,82 ± 1,6	5,8 ± 1,96	P ≤ 0,01
Pain – 1 st day at cough (NRS, scores)	4,21 ± 1,97	7,38 ± 1,41	P ≤ 0,01
Pain – 2 nd day (NRS, scores)	4,27 ± 1,35	4 ± 1,26	-
Increase in arterial pressure after skin incision	6,25 ± 7,5	22 ± 5,7	P ≤ 0,01

Results – respiratory function

	Vcmax (L)		FEV1(L)		MEF25(L/sec)	
	PVB	GA	PVB	GA	PVB	GA
Before surgery	4,0 ± 1,0	3,5 ± 0,9	3,0 ± 0,4	2,8 ± 0,6	1,1 ± 0,6	1,1 ± 0,7
After surgery	2,7 ± 0,8	1,8 ± 0,5	1,9 ± 0,6	1,2 ± 1,3	0,7 ± 0,3	0,4 ± 0,2