

Early Chest Mechanics Changes Post Lung Cancer Resection: The Effect of Thoracic Nerve Blocks

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Rationale:

Thoracic epidural block (TEB) and Paravertebral block (PVB) are used in many surgical specialties for post-operative pain relief and in the management of multiple rib fractures. It is believed, but not proven, that PVB is superior to TEB in preserving the ribs and chest wall motion. Here we explore the effect of these invasive procedures on chest wall motion.

Methods:

Structured Light Plethysmography (SLP) was used to measure chest wall mechanics for 16 patients who had TEB (n=3), PVB (n=5) or intravenous analgesia (control group) (n=8) after thoracic surgery via video assisted thoracotomy (VATS) or thoracotomy. Chest wall motion measurements were done during quiet breathing before surgery and day 1 after.

Results

The changes in overall chest wall motion one day after surgery was not significant between the three groups, 5 +/- 4 %, 11 +/- 29% and 8 +/- 11 % in TEB group, PVB group and Control groups respectively (p 0.34). Also, the motion of the operated side was reduced in all three groups but this reduction was not statistically significant, -8 +/- 15%, -17 +/- 13% and -16 +/- 21% in TEB group, PVB group and control groups respectively (p 0.21). Similarly, there was no significant difference between the three groups in chest wall motion of the non-operative side after surgery. There was also no significant difference between the three groups in synchronization of motion between the operated side of the chest and non-operated side or between the chest and abdomen both during expiratory and inspiratory phases of breathing (Table 1).

Conclusion

Contrary to common belief, our data is the first data to prove that post-operative epidural block has no negative effect on chest wall motion in comparison to the control and the paravertebral groups. This fact has a wide range of clinical implications.

	All patients								
	Day 1 post operative changes compared to pre-operative values								
	TEB	TEB	PVB	PVB	Cont.	Cont.	P	TEB	PVB
	Mean	SD	Mean	SD	Mean	SD	TEB Cont	PVB Cont	TEB PVB
% Change in motion of Overall Chest wall	5	4	11	29	8	11	0.34	0.39	0.36
% Change in motion of the Non Operated Side of the Chest	4	8	7	9	0	15	0.34	0.20	0.35
% Change in motion of the Operated side of the chest	-8	15	-17	13	-16	21	0.29	0.47	0.21
% Change in Respiratory Rate	-4	24	44	47	4	32	0.36	0.05	0.08
% Change Inspiratory time	-1	8	-24	20	0	25	0.48	0.06	0.06
% Change in Expiratory time	16	38	-28	18	14	53	0.47	0.06	0.03
% Change of synchronization between the Op and Non-Op side	82	175	265	283	126	216	0.38	0.18	0.18
% Change of synchronization between the Chest and Abdomen	56	12	53	15	31	81	0.31	0.29	0.38
% Change of inspiratory phase synchronization between Op and Non Op side	517	825	-153	800	-12717	32920	0.26	0.21	0.15
% Change of inspiratory phase synchronization between Chest and Abdomen	96	77	-1375	2815	74	553	0.47	0.1	0.21
% Change of expiratory phase synchronization between Op and Non Op side	184	374	-801	1012	-1603	3898	0.23	0.33	0.08
% Change of expiratory phase synchronization between Chest and Abdomen	23	12	82	333	-158	170	0.06	0.07	0.39

Table 1: Changes in chest wall motion and respiratory phases one day after surgery compared to the preoperative value in the three groups. The values given are: % change from preoperative value (cont.: control).