Costoclavicular brachial plexus block reduces hemidiaphragmatic paralysis : retrospective observational study

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Background and Aims

Hemidiaphragmatic paralysis (HDP) due to inadvertent phrenic nerve palsy is a well-recognized complication of supraclavicular block (SCB). Incidence of HDP during the newly defined costoclavicular block (CCB, infraclavicular block at the costoclavicular space) has not yet been evaluated. Thus, we performed a retrospective case control study in order to compare the incidence of HDP in CCB with SCB.

Method

- 315 patients were randomly assigned to two group
- CCB group (n=118)

- SCB group (n=197)

- Primary outcome : HDP (postoperative elevation of the diaphragm greater than 20 mm)**
- Secondary outcome : postoperative SpO₂ on room air and any respiratory symptoms

- Radiographic assessment of the level of the diaphragm on ipsilateral block sides : pre-, post-operative chest X-ray images

Result

3 patient (2.5%) in the CCB group versus 46 patient (39.0%) in the SCB group had HDP (P <0.001; OR, 0.041; 95% CI, 0.012-0.136). There was no significant difference in postoperative SpO₂ on room air. 4 patients in SCB group (3.4%) with chest discomfort or tightness was reported. HDP were significantly associated with not only the approach of BPB but also the injected volume.

Conclusion

The costoclavicular block significantly reduces HDP. Our results suggest that CCB may be considered for brachial plexus blocks in selected patients with pulmonary comorbidities.

Unmatched data				Matched data		
	CCB group (n=118)	SCB group (n=197)	ASD	CCB group (n=118)	SCB group (n=118)	ASD
Sex (M/F)	61/57	107/90	0.12	61/57	61/57	0.06
Age (yr)	53.5 [37.0;65.0]	58.0[40.0;68.0]	0.19	53.5 [37.0;65.0]	57.0 [41.0;66.0]	0.09
Height (cm)	163.2 [155.0;170.6]	161.0 [154.8;171.0]	0.06	163.2 [155.0;170.6]	162.1 [155.5;171.0]	0.02
Weight (kg)	60.0 [53.8;69.0]	64.0 [57.3;73.0]	0.41	60.0 [53.8;69.0]	61.8 [55.8;69.2]	0.08
Operation side (Lt./Rt.)	59/59	99/98	0.01	59/59	55/63	0.03
Local anesthetic (mL)	25.0 [20.0;25.0]	25.0 [25.0;25.0]	0.18	25.0 [20.0;25.0]	25.0 [25.0;25.0]	0.00
Pre-operative height of hemidiaphragm (mm)	5.1 [-14.0;14.2]	6.4 [-16.1;16.0]	0.02	5.1 [-14.0;14.2]	7.2 [-16.6;16.0]	0.04

Unmatched data				Matched data		
	CCB group (n=118)	SCB group (n=197)	P	CCB group (n=118)	SCB group (n=118)	P
Postoperative height of hemidiaphragm (mm)	9.0 [-10.0;20.0]	20.0 [-2.4;40.0]	<0.001	9.0 [-10.0;20.0]	17.5 [0.0;39.6]	<0.001
Difference between pre- and postoperative height (mm)	4.0 [-2.0;10.0]	15.0 [2.0;38.0]	<0.001	4.0 [-2.0;10.0]	13.5 [1.0;34.0]	<0.001
Diagnosis of HDP (>20mm)	3 (2.5%)	87 (44.2%)	<0.001	3 (2.5%)	46 (39.0%)	<0.001
Postoperative SpO ₂	98.0 [97.0;98.0]	97.0 [96.0;98.0]	0.010	98.0 [97.0;98.0]	97.0 [96.0;98.0]	0.035