Regional Scalp Nerve Block Provides Better Blood Pressure Control for Cervical Spine Surgery

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Background:

Regional scalp nerve block is an old but very useful technique in brain surgery. It includes the local anesthetics injection to supratrochlear and supraorbital nerves, zygomaticotemporal nerve, auriculotemporal nerve, and lesser occipital, greater occipital nerves. Combined with general anesthesia, it provides good blood pressure control, as well as satisfying pain management.

During many brain surgeries, the cranial fixation causes the most significant hemodynamic change, even more severe than incision to the scalp, thus intravenous analgesics or anti-hypertensive agents are required. If scalp nerve block is applied, the hemodynamics will be more stable.

If a cervical spine surgery is performed from posterior neck, it usually require cranial fixation as well. Although scalp nerve block does not provide the analgesic benefit of surgical incision site like brain surgery, we suppose it could help the hemodynamic control of cervical spine surgery.

Materials and Methods:

Our study includes patients underwent cervical spine surgery from 2015/05 to 2015/10 and the exclusion criteria are emergent surgery, patients younger than 18 years old or elder and 100 years old, or any contraindication of nerve block such as local infection or allergy. The anesthesia induction agents were fentanyl (2-3 mcg/Kg), propofol (2-3 mg/Kg) or thiamylal (4-6 mg/Kg) and cisatracurium (0.15-0.2 mg/Kg) or rocuronium (0.8-1.0 mg/Kg), followed by sevoflurane (0.7-1.3 MAC) or desflurane (0.7-1.3 MAC) or propofol (TCI Ce 3.5-5.5 mcg/ml) for maintainance. If regional scalp nerve block was performed, the local anesthetics were 0.5% levobupivacaine or 2% lidocaine, and we injected about 3ml each site for auriculotemporal and lesser occipital nerve after general anesthesia induction. Since the head and neck positioning for greater occipital nerve block may possibly cause cervical nerve damage in these patients, we did not perform it. In all patients, no matter scalp nerve block was performed or not, we closely monitored and recorded the heart rate and blood pressure during cranial fixation, if there is significant hemodynamic change, we would increase anesthesia depth and/ or add fentanyl or antihypertensive drugs such as nitroglycerin, nicardipine, or labetalol.

Group	Control	Scalp nerve block
Number	34	13
Age	61	56
Baseline HR	79	78
HR during cranial fixation	89	86
HR change	+10(+14%)	+7.7(+11%)
Baseline SBP	147	138
SBP during cranial fixation	128	115
SBP change	-19(-12%)	-23(-15%)
Baseline MBP	102	102
MBP during cranial fixation	97	86
MBP change	-5(-5%)	-16(-16%)
Baseline DBP	79	84
DBP during cranial fixation	81	71
DBP change*	+1.7(+2%)	-13(-15%)

Acknowledgement:

We sincerely thank Prof. Ya-Jung Cheng (Department of Anesthesiology, National Taiwan University Hospital and National Taiwan University Medical College) and Prof. Thomas J.K. Toung (Department of Anesthesiology and Critical Care Medicine, Johns Hopkins Hospital) for the experience sharing of scalp nerve block.

Results:

The total number of elective adult cervical spine surgeries during these six months were 109, and 47 of these patients required cranial fixation. All of them were in prone position with their head fixed using Mayfield skull clamp. Thirteen patient received regional scalp nerve block and 34 didn't. The baseline heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP) were 79 beats/min vs 78beats/min, 148 mmHg vs 138 mmHg, 78 mmHg vs 84 mmHg in control and scalp nerve block groups. During cranial fixation, the HR, SBP, DBP were 89 beats/min (+13%) vs 86 beats/min (+10%), 128 mmHg (-14%) vs 115 mmHg (-17%), 81 mmHg (+2%) vs 71 mmHg (-15%) in control and scalp nerve block groups. The DBP change value and percentage were both significantly different (p-value 0.02 and 0.03). There was no adverse event caused by regional scalp nerve block in our study.

Conclusion:

In patients with regional scalp nerve block to auriculotemporal and lesser occipital nerve, the hemodynamic control, especially diastolic blood pressure, is better than patients without regional scalp nerve block. It is an effective and safe technique for posterior cervical spine surgery requiring cranial fixation.

References:

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