A Randomized Comparison of the Neuropen® and a Plastic Disposable Neurologic Wheel for Assessing Spinal Block at Cesarean Section

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Introduction: The best method of assessing spinal blockade should minimize inter-observer variability and consistently predict adequate surgical anesthesia. The Neuropen® (NP) is a useful standardized user-independent tool for assessing sensory blockade. (1) We compared a plastic disposable neurologic wheel (PDNW) to the NP hypothesizing that the level of blockade assessed by the two instruments would be identical and would accurately predict adequate surgical anesthesia.

Methods: Following IRB approval and written informed consent, 25 parturients needing anesthesia for cesarean section (CS) were enrolled into the study. Spinal or combined spinal-epidural anesthesia was induced using intrathecal (IT) combinations of bupivacaine (12-15 mg), fentanyl (0-25 µg), clonidine (0-20 µg) and morphine (0-200 µg). After IT injection, the highest level of block until return of light touch and sharp touch sensation were assessed by two designated anesthesiologists, blinded to each other’s findings, one using the NP and the other using the PDNW. Instrument used and assessment orders were randomized. Assessments were done every 5 minutes for 20 minutes and at the end of surgery, using dermatome markers on the patient’s abdomen. Interval VAS scores were recorded.

Statistical Methods: The Mann-Whitney-U test was used to compare height of block between devices and between time periods.

Results: Four enrolled patients were excluded due to technical problems.

Primary Endpoint: No significant differences emerged between assessments made with the NP and the PDNW at any time. (Figure 1)

Secondary Endpoints: spinal level rose over the 20 minute period with a significant difference between each measurement point and the subsequent point.

We also observed a difference between level to sharp and light touch that varied unpredictably over time.

Discussion: Our results support the hypothesis that the PDNW is a reliable device that compares favorably with the NP in assessing IT block for CS. It has the advantages of being inexpensive, compact, convenient and disposable. In addition, an interesting divergence between perception of sharp vs. light touch that varied unpredictably over time was observed. This phenomenon may explain apparent inconsistencies in the relationship between sharp and light touch reported in previous studies and will be further investigated.

Figure 1: Level of block by sensory testing. There were no significant differences in block levels assessed by neuropa and pinwheel. Median values are plotted with upper and lower quartiles represented by the error bars. Open circles represent range of values. All levels below T-10 are represented by one level.