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Title: VITAL SIGNS DURING AND AFTER LUMBAR EPIDURAL STEROID INJECTIONS

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Introduction: Lumbar epidural steroid injections with local anesthetic (LESI) are one of the most common blocks performed in pain clinics.[1] Cardiovascular complications such as hypotension have been noted if inadvertent subdural or subarachnoid injections are made. No study has evaluated the cardiovascular consequences during or after correctly performed LESI, however the clinical impression is that these blocks are "safe". Despite this fact 31% of pain clinics insert an intravenous line in patients prior to LESI.[1] This prospective study monitored vital signs before, during and after LESI.

Methods: After institutional review board approval, 192 consecutive patients scheduled for LESI were studied. Two patients had evidence of dural puncture prior to injection and were excluded. All patients were NPO >8 hrs. LESI consisted of 10 ml bupivicaine 0.125% with methylprednisolone acetate 80 mg in the lumbar area closest to the site of pathology. Vital sign measurements included systolic, diastolic and mean non-invasive blood pressure (BP), heart rate (HR) and pulse oximeter oxygen saturation (SpO_2). Measurements were made at baseline, prior to prep (Time 1), q 5 min during needle insertion till injection into epidural space (Time 2), q 5 min. x 3 after injection, supine (Time 3) and 1 min. later, sitting (Time 4). Statistical analysis included paired t-tests.

Results: The average age was 50 y/o with a range of 19-87 y/o. Half the patients were female. Table 1 reveals the vital signs during the 4 time periods. No evidence of a subarachnoid block was evident in any patient. There were statistically significant increases in HR and BP during the procedure as well as statistically significant decreases in HR, BP and SpO_2 during the first 15 min after the injection. BP was unchanged after sitting compared to baseline. These changes in vital signs are not clinically significant. Restricting analysis to patients ≥ 60 y/o (N=57), revealed no important changes in the data. No patient exhibited difficulties in a 10-15 minute observation period after time 4.

Discussion: LESI with bupivicaine 0.125% appears to be well tolerated in this population of patients. Although evidence of sympathetic blockade would be expected, no clinically significant hypotension or HR changes were seen despite provocative maneuvers. The pain associated with the procedure induced no clinically significant changes in vital signs. It appears that vital signs are quite stable during and after LESI . Sedation to prevent catecholamine rise or the use of intravenous fluids to prevent hypotension is not necessary. Despite the lack of abnormal vital signs, monitoring is suggested to alert the physician to the possibility of inadvertent subdural/subarachnoid or intravenous injection.

References:1. Anesthesiology 71 (3A): A736, 1989.

	Time 1	Time 2	Time 3	Time 4
HR	79±1	81±1*	75±1*	76±1*
Syst BP	133±2	141±2*	124±1*	132±2
Mean BP	96±1	104±2*	88±1*	99±1
SpO_2	95±0.3	95±0.3	94±0.3*	96±0.3

N=190 mean±SEM *=p<0.001 compared to Time 1
Table 1.

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TITLE:

A FUNCTIONAL MEASURE OF THE EPIDURAL SPACE

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INTRODUCTION:

While the epidural space (ES) is widely used to provide anesthesia and analgesia, its exact physical dimensions remain the subject of on-going study[1]. Information derived from cadaveric study[2] and radiologic exam[3], which provide the bulk of anatomic information cconcerning the ES, may not accurately reflect clinical practice. Using a technique which reproduces clinically encountered conditions, we measured the functional span of the ES.

MATERIALS AND METHODS:

31 ASA 3 and 4 patients scheduled for vascular surgery gave informed consent to an IRB approved catheter spinal study. With the patient in the sitting position, the ES was located using a midline "hanging drop" technique through a 17 gauge Tuohy needle at either L3-4 or L4-5. After negative pressure was noted, the needle was advanced without the introduction of air or fluid until clear CSF was established. An 18 gauge nylon catheter was placed in the subarachnoid space and the needle removed. The following parameters were recorded: age, weight, height, distance from the skin to the establishment of negative pressure (SE), distance from initiation of negative pressure to clear flow of CSF (ES), and CSF pressure.

RESULTS:

Two patients had no discernable "negative pressure" space observed prior to free flow of CSF and were excluded from further analysis. The remaining 29 patients has a mean age of 66 years (range 55-79), mean height of 167.7 cm (range 143-188), and mean weight of 70 kg (range 55 to 105). (SE ranged from 32 to 72 mm (mean 57.6), while ES ranged from 2 to 14 mm (mean 8.88 mm). CSF pressure measured immediately after catheter placement ranged from 11 to 27 mm Hg (mean 17 mm Hg), all patients were judged to be euvolemic (as judged from central pressures) ES was plotted against height, weight, and SE. There was no correlation between ES measurements and any of these other parameters. (R values .143-.602).

DISCUSSION:

Our results reveal that the ES is not only deeper than has been reported (6 mm)[1] but more variable (in thickness) as well. Previous studies using cadaveric models[3] or radiographic exams[2] of the exant patient introduce variable (presence/absense), amount of CSF pressure, epidural blood flow, introduction of resins, and contrast material) which may invalidate the direct application of these findings to clinical practice. That is, the results speak more to the anatomist than the anesthesiologist. We feel that the use of the "hanging drop" technique to establish entrance into the ES and clear flow of CSF to signal entrance into the subarachnoid space, provides a functional measurement of the ES, which can be directly applied to clinical practice. Variables inherent in our measurement technique (volume status, "tenting" of the dura by the needle tip etc.), should be consistent between patients and it may simulate conditions encountered in epidural cannulization.

REFERENCES:

1. Neurosurgery 17: 6, 905, 1985
2. Anaesthesia 43: 837, 1987
3. Br. J. Anesth 57: 333, 1985