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TITLE: WHERE DO SPINAL CATHETERS GO
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Introduction: Continuous spinal anesthesia (CSA) has gained immense popularity at our institution over the last 8 years, essentially when dealing with a subset of elderly patients undergoing orthopedic surgery (1). CSA like epidural anesthesia requires the insertion of a catheter and malplacement or difficulties in threading can be observed. The placement of spinal catheters was examined radiologically in a prospective study in order to determine the predictability of the level of lumbar puncture as well as direction of catheter insertion, and the incidence of threading difficulties.

Method: Twenty-nine consenting elderly patients underwent CSA for orthopedic surgery. Lumbar puncture was performed at the L3-4 (or L2-3) interspace with a 18G Tuohy needle, and a 20G catheter was inserted 3 to 4 cm cephalad after obtention of a free reflux of cerebrospinal fluid. If threading the catheter cephalad was impossible, the Tuohy needle was rotated caudally, the catheter inserted for a few mm, and the needle rotated back cephalad together with the catheter partially threaded, for further cephalad insertion up to 4 cm. All patients received in the lateral decubitus position 7.5 mg of either tetracaine or bupivacaine as hypobaric solutions. After the surgical procedure, all catheters were radiologically controlled by injecting 2ml of radiopaque dye and the level of lumbar puncture as well as the level and direction of the tip position were noted.

Results: The mean age of the 29 patients included in the study was 65±6 years. One catheter dysfunction was noted due to secondary displacement into the epidural space; in this case the initial injection of the local anesthetic achieved adequate anesthetic conditions (T7), but the first reinjection was unsuccessful. Of the 29 lumbar punctures studied, only 12 (41.4%) were actually performed at the assumed interspace as seen in table 1.

Table 1: LUMBAR PUNCTURE (n=29)

| Assumed level | | Confirmed level | | |
|---------------|------|-----------------|------|------|
| | | L1-2 | L2-3 | L3-4 |
| L2-3 | n=5 | n=1 | n=3 | n=1 |
| L3-4 | n=24 | n=1 | n=14 | n=9 |

28/29 X-rays were analyzed for catheter position and direction. 20/28 (71.4%) catheters were successfully placed cephalad as shown in table 2. Seven/28 (25%) catheters had their tips located at L3, 17 (61%) at L2, 2 (7%) at L1, and 2 (7%) at T12. In the 4 patients in whom the initial cephalad threading of the catheter was difficult, no paresthesias or neurological deficits were noted. Finally, in all cases anesthesia was adequate and the position of the catheter did not influence the sensory level obtained on the operated limb.

Table 2: CATHETER THREADING (n=28)

| Assumed direction of catheter threading | | Radiologically controlled direction of catheter threading | | |
|---|------|---|------------|--------|
| | | Cephalad | Horizontal | Caudal |
| Cephalad easy | n=24 | n=18 | n=5 | n=1 |
| Cephalad difficult | n=4 | n=2 | n=1 | n=1 |

Conclusions: In spite of the threading difficulties encountered in 4 patients, all catheters were inserted and were effective. Only one secondary displacement was noted. In addition, more than 70% of catheters were placed cephalad. On the contrary, the clinical determination of the level of lumbar puncture was inadequate in 59% of cases. This could probably be explained by the important skeletal deformities observed in elderly patients. Our data suggest that the positioning of a spinal catheter does not seem to influence the level and quality of anesthesia observed.

References:

1. Anesthesia 1989; 44: 47-50

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TITLE: SPINAL CATHETER SIZE AND LOCAL ANESTHETIC DOSING: A RETROSPECTIVE REVIEW

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INTRODUCTION:

The safety of catheter spinal anesthesia (CSA) has been called into question due to the reports of associated neurologic sequelae¹. Prominent among the factors indicted in these cases has been catheter size. It has been proposed that micro-bore spinal catheters allow maldistribution of local anesthetic solution^{1,2} with resultant injury. Also, technical difficulties associated with smaller catheters may encourage the use of more concentrated, and potentially more harmful anesthetic solutions¹. A retrospective analysis of CSA for a 12 month period were reviewed in order to compare spinal catheter size, local anesthetic dosing and neurologic outcome.

MATERIALS AND METHODS:

CSA performed over a 12 month period (12/89 -12/90) were reviewed. Data retrieved included age, sex, surgical procedure, spinal catheter size, local anesthetic agents employed and dosing as well as length of surgical procedure. Available data, (medical records, Quality Assurance data, etc.), was reviewed to evaluate for episodes of new-onset neurologic deficits.

RESULTS:

95 patients, all male (mean age 65.8 years, range 31 to 95) received CSA for a variety of surgical procedures. All CSA performed used 5% lidocaine (hyperbaric, Astra) solution. 51 patients had macrocatheters (M) (20 gauge or larger) and 44 had microcatheters (m) (28 gauge or smaller). Age, average length of surgical procedure (M-243 minutes, m 183.6 minutes), and lidocaine doses (initial M-41.9 mg (mean 146.5) initial m 42.2 mg (mean 126.7) were not statistically different in either group. One patient, who had CSA performed with a 28 gauge catheter developed an isolated L5 motor root impairment following vascular surgery. After extensive workup, the consensus opinion of multiple consultants was that this injury was secondary to heparin therapy and not CSA.

CONCLUSIONS:

This data fails to support the hypothesis that when compared to macrocatheters, microcatheters necessitate increased local anesthetic dosing (or concentration) or are neurologically unsafe. Further, the observation that smaller (than expected) doses of local anesthetics can be employed with CSA, put forth by Tuohy³, seems to be supported by these observations. Large doses of local anesthesia, especially hyperbaric lidocaine, which have been associated with untoward neurologic outcome were not needed and do not appear to be justified. CSA appears to be a safe technique, regardless of catheter size when the appropriate amounts of care (local anesthetics dosing, etc.) are employed.

REFERENCES:

1. Anesth Analg 72: 275, 1991
2. Anesth Analg 70: 97, 1990
3. Anesthesiology 5: 142, 1944