Table 1. Thiopental Precipitation of Epidural Solutions as a Function of pH and Concentration

Solution	pH*	Precipitate
0.9% Normal saline	5.9	–
Cerebrospinal fluid	7.31–7.34	–
Fentanyl citrate	6.0	–
Thiopental sodium (pentothal)	10.2	–
2% Chloroprocaine (nesacaine MPF 2%)	3.2	+++
1.5% Lidocaine + epinephrine 1:200,000 (xylocaine MPF 1.5%)	4.1	+++
0.25% Bupivacaine (sensorcaine MPF 0.25%)	5.4	+++
0.125% Bupivacaine + fentanyl 2 μg/mL	5.6	++
0.083% Bupivacaine + fentanyl 2 μg/mL	5.8	+(trace)
0.063% Bupivacaine + fentanyl 2 μg/mL	5.9	–
0.045% Bupivacaine + fentanyl 2 μg/mL	6.1	–

*pH measured by Beckman pH meter (Anaheim, CA). Standards used: 4, 7, 10. Each test was repeated three times. Precipitate classification: –, clear fluid; +, trace, almost clear; ++, cloudy; +++, milk-white precipitation.

various infusion solutions for pH analysis and precipitation test with thiopental. One milliliter of each solution was mixed with 1 mL of thiopental and observed for presence of precipitate. Our results are shown in Table 1.

We found that as the solutions became more dilute (< 0.083% bupivacaine), a trace to no precipitate was evident. In addition, an inverse relationship was observed between pH and precipitation with thiopental.

We conclude, based on our results, that the thiopental precipitation test is unreliable for differentiating dilute local anesthesia and opioid solution (0.04–0.08% bupivacaine + 2 μg/mL fentanyl) from CSF in an aspirate from an epidural catheter.

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Comment on Spinal-Epidural Anesthesia Case Report by Eldor et al.

To the Editor:

I read with interest the case report by Eldor et al.[1] The authors attribute the respiratory arrest in their patient to subarachnoid spread (via the dural hole) of the epidurally injected morphine. While indeed this could be the mechanism of their observed findings, it is also possible that the events were due to pure epidural morphine-induced respiratory depression. The authors completely dismiss this with their statement: "Three and a half milligrams of morphine injected properly into the epidural space should not cause respiratory arrest," and never again do they acknowledge this as a possibility. I quite agree that 3.5 mg of epidural morphine is unlikely to cause respiratory arrest, but certainly it can. Two recent reviews (neither referenced by Eldor et al.) point out that doses of epidural morphine similar to that given in their case can indeed cause respiratory depression.[2,3] Certainly, subarachnoid opioids are more likely than epidural opioids to cause adverse side effects, such as respiratory depression. However, these side effects can be and are seen following epidural administration of opioids. To summarily dismiss this in their differential is, in my opinion, misleading and unnecessarily accusatory of the needle-through-needle technique for combined spinal-epidural anesthesia. Dr. Eldor does not now present, nor has he ever presented, any scientific evidence with

regard to either the risk or lack thereof of any particular technique of combined spinal-epidural anesthesia.

Dr. Eldor comments on the case report by Myint, and states that "if Myint had given the patient another bolus of 2 mL these vital signs would have disappeared." How does Dr. Eldor know this? Such pure speculation has no place in an allegedly scientific manuscript.

Dr. Eldor refers to the report by Brownridge, wherein allegedly more than 1,000 cesarean deliveries using a double-space combined spinal-epidural technique were performed without the occurence of respiratory depression. A glance at Brownridge's letter to the editor reveals that he makes no mention of the use of either subarachnoid or epidural opioids. How this report is relevant to the discussion by Eldor is unclear. Dr. Eldor has, in the past, been criticized for improper quoting of others' works.[4]

In his recent case report, Dr. Eldor shows wonderful pictures, such as his Figure 1, indicating how an epidural catheter could traverse through the dural hole made by a spinal needle. This risk is also pure speculation. Dr. Eldor should refer to the work by Hölmstrom et al., who attempted, under epiduroscopic control, to place epidural catheters through dural holes made by a 25-gauge spinal needle. Holmstrom concludes that "it was impossible to force 16 or 18 G epidural catheters through the dural hole made by a single dural puncture with a 25 G spinal needle. *Even when five holes were made in the same area of dura* [italics are mine] by a 25 G spinal needle...the epidural catheters could not be forced through the dura."[4]

It is well known that Dr. Eldor has designed his own needle device system for use with combined spinal-epidural anesthesia, and he is actively promoting this device (in multiple journals and languages[6–13]). In this regard, is the current case report, which emphasizes a possible adverse effect of the needle-through-needle technique, a type of "scientific advertising" for Dr. Eldor's own device? Should the authors have mentioned this apparent conflict of interest with the publication of their report? Or is this entire case report merely a veiled attempt at promotion of Dr. Eldor's device? In my opinion, the answer is obvious.

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Gerard W. Ostheimer, M.D.

Severe Lumbar Pain and Epidural Anesthesia

To the Editor:

The case report of severe lumbar back pain after epidural injection of local anesthesia for epidural anesthesia stimulated our interest.[1]

The article describes different etiologies that might explain the atypical late reaction of the patient after subsequent top-up doses in the epidural space. It is also quite remarkable that the anesthesia was limited to analgesia and not to an extensive motor block. The occurrence of pain after the last top-up dose, which reached a total volume of 26 mL, is unusual. One might question why such a high volume was injected epidurally in an old patient (75 years). It is well described in the literature that the capacity of the epidural space becomes smaller in older patients.[2]