Spinal/Epidural Morphine in the Combined Spinal/Epidural Anesthesia Model

To the Editor—In a recent paper, Bernard et al. describe the effect of the hole made in the dura on the passage of lidocaine and morphine through it. They concluded that their study "suggests that drug movement through the meningeal hole is responsible" for the high spinal blocks and total spinal anesthesia accidents in the combined spinal-epidural anesthesia (CSEA) model. However, based on their data, I calculated the amount of spinal morphine 30 min after epidural injection in their model (table 1). Even after the 18-G Tuohy needle punctures the dura, the total amount of spinal morphine is only 0.278 mg when 2.5 mg are injected into the epidural side. This amount only accentuates the epidural morphine analgesic effect and does not cause respiratory depression. In my opinion, other causes for respiratory depression after CSEA include injection of a large amount of morphine through the epidural catheter that unintentionally enters the subarachnoid space. This, and not the small hole in the dura, is the real danger in the needle-through-needle technique for CSEA.

Joseph Eldor, M.D.
Department of Anesthesia
Misgav Ladach General Hospital
P.O. Box 12142
Jerusalem 91120, Israel

Table 1. Spinal Morphine 30 Minutes after Epidural Injection in the Combined Spinal/Epidural Anesthesia Model

<table>
<thead>
<tr>
<th>Drug</th>
<th>Epidural (mg)</th>
<th>Spinal (mg)</th>
<th>Spinal/Epidural (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intact</td>
<td>2.5</td>
<td>0.0057</td>
<td>0.229</td>
</tr>
<tr>
<td>27-G Whitacre</td>
<td>2.5</td>
<td>0.0105</td>
<td>0.420</td>
</tr>
<tr>
<td>24-G Sprotte</td>
<td>2.5</td>
<td>0.0496</td>
<td>1.987</td>
</tr>
<tr>
<td>18-G Tuohy</td>
<td>2.5</td>
<td>0.2780</td>
<td>11.121</td>
</tr>
</tbody>
</table>

Reference
(Accepted for publication July 18, 1994.)

In Reply:—We appreciate Eldor's interest in our study. However, we would like to point out some misconceptions in his letter.

1. As detailed in our manuscript, the amount of drug moving from the epidural space to the subarachnoid space is the sum of the amount crossing the intact meninges and the amount passing through the meningeal hole made by the spinal needle. Thus, the 0.278 mg of morphine that Eldor calculated would cross the meningeal hole is an unintended amount of morphine that would reach the subarachnoid space in addition to the amount of drug that diffuses across the intact meninges. For a variety of reasons discussed in our manuscript, it is not possible to determine the net amount of drug that reaches the subarachnoid space by each of these two routes in vivo. However, it is clear that the meningeal hole allows more drug to accumulate in the subarachnoid space than would otherwise be the case.

2. Contrary to Eldor's assertion, 0.278 mg of subarachnoid morphine is sufficient to produce significant respiratory depression and sedation in some patients. In addition, the 2.5-mg morphine dose upon which Eldor bases his computation is on the low end of the dose commonly used in the epidural space. Appropriate larger morphine doses would result in correspondingly greater amounts of morphine reaching the subarachnoid space.

We agree with Eldor that additional mechanisms for drug to reach the subarachnoid space during combined spinal-epidural anesthesia (CSEA) must be considered. We also agree that migration of an epidural catheter into the subarachnoid space is one possible mechanism by which drug intended for the epidural space may reach the subarachnoid space. However, based upon our study, we believe that the hole made in the spinal meninges during CSEA is a potentially important route for epidural drug to reach the subarachnoid space.

Christopher M. Bernards, M.D.
Assistant Professor
Department of Anesthesiology RN-10
University of Washington
Seattle, Washington, 98195

Dan J. Kopacz, M.D.
Staff Anesthesiologist
Department of Anesthesiology

Anesthesiology, V 81, No 4, Oct 1994