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Additional Comments Regarding an Anesthesiology-based Postoperative Pain Service

To the Editor:—We were encouraged to see Ready's[1] recent article outlining the organization of an anesthesiology-based acute pain service. We would like to comment based on our 1-yr experience at Emory University with 1250 patients.

One problem, not mentioned by Ready, that will arise when starting an acute pain service concerns administration of epidural drugs by nurses. Many states either don't allow it or don't specifically address it in their nursing practice acts that may legally jeopardize the nurses. It should be emphasized that strict guidelines for administration of epidural drugs should be established and a physician skilled in resuscitation should be immediately available.

Some of the problems associated with administration of epidural drugs by nurses may be avoided by using continuous infusions. Continuous infusion also allows the use of lipid soluble opiates so that the incidence of side effects and respiratory depression may be decreased and peaks and troughs of drug concentration in CSF are avoided. Solutions for infusion may be prepared from concentrated, preservative-free opiate solutions that are more economical than Duramorph.®

Respiratory depression may occur with any technique of administration of potent opiates. Preventable causes must be ascertained so that techniques or policies can be changed when appropriate. We have seen respiratory depression related to epidural catheter migration, pharmacy errors, and abnormal opiate metabolism. Unlike Ready, we have seen two cases of respiratory depression in the postoperative period with patient-controlled analgesia (PCA), including one with airway obstruction, and an anephric patient with prolonged respiratory depression after receiving morphine.

We agree that decreased tidal volume often precedes decreased respiratory rate from epidural opiate overdose. Somnolence has preceded respiratory depression in all cases that we have seen. Therefore, good nursing observation is superior to any respiratory monitor now available.

One area in which we disagree with Dr. Ready is his opinion that a history of inappropriate opiate use and drug-seeking behavior contraindicate PCA use. While it is true that such patients administer larger doses of opiates than their peers, due to tolerance, we administer these higher doses until they can take oral medicines. This avoids the problems of opiate withdrawal and establishes their baseline drug use. Then they are changed to oral methadone given in a consistent volume of vehicle on a time contingent basis. Slow, gradual withdrawal from methadone is then facilitated if it is medically indicated.

We feel that our involvement in postoperative pain treatment has increased patient comfort and prevented postoperative complications, while providing opportunities for residents to learn, as well as a rewarding mode of practice.

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REFERENCE

1. Ready LB, Oden R, Chadwick HS, Benedetti C, Rooke GA, Caplan R, Wild LM: Development of an anesthesiology-based postoperative pain management service. ANESTHESIOLOGY 68:100–106, 1988

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In Reply:—We appreciate the comments of Drs. Hammonds and Hord related to our recent publication. Our own experience with postoperative pain has now increased to over 1800 patients. Over 1200 have received multiple doses of epidural opiates, while most of the remainder have used patient-controlled analgesia (PCA). In addition, we have now administered single injections of either epidural or subarachnoid morphine to 700 women following cesarean section.

We are aware that it is not possible in all areas for ward nurses to inject epidural opiates. It is our hope that responsible investigators in locations where nurses can function in this manner will describe protocols, document outcomes, and publish their results. Hopefully,

state nursing authorities will respond by developing favorable policies in the future. We completely agree with the need for strict guidelines and immediate medical support when epidural opiates are used.

Continuous infusion of epidural opiates is a reasonable alternative to bolus injections. We have initiated a randomized blinded study to determine whether quality of analgesia or incidence of side effects differ with these two modes of drug delivery. Most of our patients, however, still receive epidural morphine by nurse-administered bolus injection. In our hospital, continuous infusions of epidural opiates increase patient costs. The hospital assigns charges for the use of an infusion pump, and the hospital pharmacy charges a professional fee for dispensing the infusion solutions.

Our experience with respiratory depression has not materially changed as our experience continues to grow. We do not see life-threatening events—perhaps, since milder forms of the problem are detected with the monitoring protocols we use. We are interested to note somnolence preceded respiratory depression in all cases seen by Drs. Hammonds and Hord. This reinforces our belief in the importance and utility of level of consciousness as a monitoring tool. We urge other practitioners to consider its routine use. The bedside sedation scale we use is as follows: 0 = None (alert); 1 = Mild (occasionally drowsy; easy to arouse); 2 = Moderate (frequently drowsy; easy to arouse); 3 = Severe (somnolent; difficult to arouse); and S = Sleep (normal sleep; easy to arouse).

Ward nurses rate level of consciousness hourly during the first 24 h of epidural opiate analgesia. We remain convinced that trained vigilant nurses are essential for safe practice with epidural narcotics.

As our experience with PCA has increased, we, too, in selected cases, have offered this device to patients with histories of inappropriate opiate use and drug-seeking behavior. We have found it useful to discuss PCA with these patients preoperatively, including its expected duration of use and the transition to oral methadone. Physicians already experienced in managing this difficult group of patients may find PCA very useful. Physicians without this experience may wish to seek consultation or use more conventional means for pain management.

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Arrow Brachial CVP Air Aspirating Catheter Placement with the IVECG Technique

To the Editor:—Using a single-orificed catheter as an ECG lead, Martin correlated the resultant ECG trace with the catheter's intra-atrial position as confirmed by chest x-ray.[1] Termed intravascular electrocardiography (IVECG), this technique has been used to successfully insert single-orificed catheters into the right atrium. Catheters designed to aspirate air from the right atrium, however, have multiple orifices to maximize their effectiveness. Previous work has shown that the IVECG technique can be used to accurately locate the multiorificed catheter, knowing that the IVECG is conducted from the proximal orifice,[2,3] and not the catheter tip. Recently, Colley and Artru found that the IVECG was conducted from a middle orifice using the commercially available Cook Bunegin-Albin multiorificed catheter.[4] It seems, therefore, that each multiorificed catheter design should be tested for the site of IVECG conduction before accuracy of this technique can be insured. For this reason, a study was undertaken to determine the site of the IVECG conduction of the commercially available Arrow Brachial CVP multiorificed catheter.

This study was approved by our institution's Human Investigation Review Board and informed consent was obtained. A custom-made, double-lumen catheter was used as the test catheter (Arrow International, Inc., Reading, PA). One lumen had a single orifice at its tip, while the second lumen was identical in design to the Arrow brachial CVP multiorificed catheter. This catheter has four side orifices (1 mm diameter) with the proximal orifice either 2.5 or 2.75 cm from the catheter tip.

Prior to pulmonary artery catheterization, this test catheter was inserted through a sheath in the right internal jugular vein in seven patients prior to their coronary artery bypass grafting. The catheter was advanced in 1-cm increments into the right atrium and IVECGs from both lumens using the catheter-F (intracardiac-left leg) lead,[5] were simultaneously recorded as previously described.[2] The results showed that the distance be-