catheter ascertained postoperatively? Finally, what were the visual analog scale pain scores before these events occurred (between 2 PM and 4:30 PM)?

These questions are important because cancer patients who have used oral or parenteral opioids preoperatively have peridural opioid requirements significantly greater than patients not receiving opioids. Reviewing our experience in our Acute Pain Service with 1,000 patients who underwent surgery for cancer over a 2.5-yr period,* we found that patients who have been taking opioids preoperatively for pain control are a special group of patients who require two to three times the normal doses of epidural morphine when administered *via* a continuous infusion. Furthermore, psychologically they also behave differently, and we have assigned one specific anesthesiologist to deal with these special cases. In addition, young patients with metastatic sarcomas generally undergo several major surgical procedures and have experienced significant pain during the course of their disease. Thus, they learn to prevent the onset of severe pain instead of treating severe pain at its peak intensity. The patient described by Kreitzman and Samuels received 0.2-mg·h^{-1} dosage of hydromorphone, or 1.2 mg every 6 h, which is a normal dose for the average surgical patient when intermittent bolus injections are used.† It seems from his actions that his analgesic requirements were much greater than the prescribed dose.

It is also possible that this patient had a nonfunctioning or malpositioned epidural catheter and that the persistence of pain motivated his manipulation of the infusion pump in order to provide an adequate dose of opioids. If this catheter was in the epidural space, he received 3.55 mg hydromorphone in 2.5 h, which is about three times the normal dose. Yet the patient did not develop any signs or symptoms of epidural opioid overdose. As stated by the authors, hydromorphone is less lipid-soluble but more potent than morphine. We would have expected such a dose to be associated with more sedation and respiratory depression unless the patient had already been taking large doses of opioids preoperatively or the epidural catheter was outside of the epidural space.

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REFERENCES

1. Kreitzman R, Samuels SI: Epidural opioid infusion: An unusual problem. ANESTHESIOLOGY 73:1272–1273, 1990

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* Manuscript in preparation.

† Wakerlin G, Shulman M, Yamaguchi LY, Brodsky JB, Mark JBD: Experience with lumbar epidural hydromorphone for pain relief after thoracotomy. (Abstract) Anesth Analg 65:S163, 1986

Anesthesiology
74:1159, 1991

In Reply:—As suggested, possible causes of increased analgesic dosage requirement include tolerance caused by preoperative opioid use and nonfunctional or misplaced catheters. Tolerance to opioid would seem unlikely here because, as stated in the case report, the patient was not receiving any medications preoperatively.[1] We also believed that our lumbar epidural catheter was functioning because the patient was subjectively and objectively (visual analog scores < 3) comfortable prior the first overdosing incident (and the next morning). Thus, since the patient had been pain-free, we doubt that his actions were related to higher analgesic requirements or persistent pain.

We believe that this was a case of curious but uneducated fingers playing with potentially dangerously unsecured pump controls. The question, which, however, is still unresolved at this time, is why this patient had no serious side effects given the pharmacologic characteristics of hydromorphone and the large dose he received.

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REFERENCES

1. Kreitzman TR, Samuels SI: Epidural opioid infusion: An unusual problem. ANESTHESIOLOGY 73:1272–1273, 1990

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A Method to Prevent Tampering with an Infusion Pump

To the Editor:—In a recent case reported by Kreitzman and Samuels,[1] concern was raised about patient tampering with an epidural infusion pump. They mentioned that a simple, effective and inexpensive device, such as a locking cover for the infusion pump, would be desirable. At our hospital, we have been using an IMED infusion pump fitted with such a device (fig. 1). The cover is clear plastic and hinged at the top

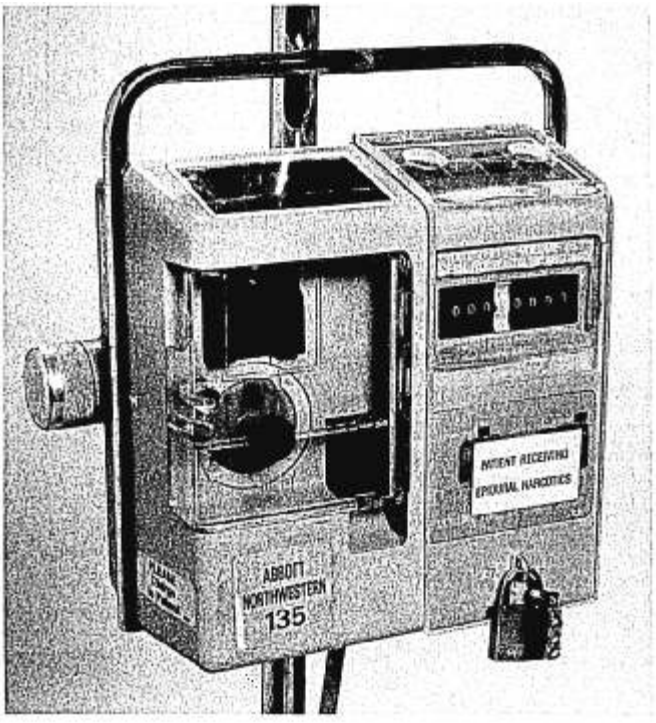

FIG. 1. Modified infusion pump for epidural narcotic use.

of the pump and covers the infusion buttons as well as the rate and volume dials. A lock has been placed at the bottom of the unit, and the key is kept in the nursing unit narcotic box. Two holes have been drilled through the cover, allowing access to the on/off button and the start button without the need for the cover to be lifted. These units have then been designated for epidural use only. We have found this cover to be a safe and effective device in preventing tampering of an epidural infusion.

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REFERENCES

1. Kreitzman T, Samuels S: Epidural opioid infusion: An unusual problem. ANESTHESIOLOGY 73:1272–1273, 1990

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74:1160–1161, 1991

Recantation Revisited

To the Editor:—Weinger and Englund did a fine job of identifying factors affecting our *raison d'etre,* vigilance.[1] They were a little off the mark, however, when in the paragraph (p 999) on environmental toxicity they cited findings by Bruce and colleagues[2] that no one else was able to reproduce and then said, "although the data still are somewhat controversial." They either were being kind or were unaware of a letter to the editor published in 1983,[3] in which we tried to recant their earlier assertion that trace anesthetics *did* affect performance. The *data* were not controversial. The conclusions based on them were incorrect.

In our original study, we studied volunteers, almost all of whom were dental students.[2] These subjects were very sensitive to trace anesthetics and showed performance impairment when exposed to as little as 50 ppm N_2O and 1 ppm halothane.[4] Within weeks of these experiments and before they were published, representatives of the National Institute of Occupational Safety and Hygiene (NIOSH) met with investigators working in the field of trace anesthetic exposure and decided to recommend routine scavening in anesthetizing locations. The question was asked, to what level? This was answered: below the lowest level for which there is any evidence of ill effect and to which is would be technically possible to scavenge by simple, inexpensive means. Our results at 50/1 ppm were the only data at low anesthetic levels that indicated adverse human effects. Since Charles Whitcher's studies at Stanford had shown it was possible to scavenge to 25 ppm N_2O, that was where the standard was set. The 25 ppm N_2O to 2 ppm halogenated agent ratio was an attainable standard for which no evidence of toxicity of any sort had ever been shown and was therefore agreed upon.

Several years later, we learned that most of the subjects we studied were Mormons, and as such, might have been abnormally sensitive to depressant drugs in a manner similar to that of Stanley's patients.[3] There is no longer any need to refer to our conclusions as "controversial." They were wrong, derived from data subject to inadvertent sampling bias and not applicable to the general population. The NIOSH standards should be revised.

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REFERENCES

1. Weinger MB, Englund CE: Ergonomic and human factors affecting anesthetic vigilance and monitoring performance in the operating room environment. ANESTHESIOLOGY 73:995–1021, 1990
2. Bruce DL, Bach MJ, Arbit J: Trace anesthetic effects on perceptual,