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The Effect of Anesthetic Technique on Postoperative Analgesia Requirements

To the Editor:—In the study by Shir *et al.*,¹ patients who had prostatectomy under epidural anesthesia without general anesthesia required less postoperative analgesia than did patients who had the operation under a less extensive epidural block with a general anesthetic. It thus is misleading on the part of the authors to suggest that these results “indicate that complete intraoperative blockade of afferent signals to the central nervous is fundamental in decreasing postoperative pain,” because their study design does not control for the confounding effect due to the general anesthetic that was administered to only one of these two groups. Certainly, the explanation given is possible, but their failure to discuss alternative explanations, or indeed to acknowledge the limitations of their study, detracts from their report.

The failure to control for the effects of general anesthesia is not trivial, because patients in the two groups inevitably will have undergone different perioperative experiences, which may have had a bearing on their subsequent analgesic requirement. The well known effect that psychologic factors can have on pain perception and analgesic requirement makes it possible that patients who remained awake during surgery developed a greater degree of stoicism by having experienced the operating room environment, which, if transferred to the postoperative period, may have led to the lower analgesic requirement. Alternatively, they may have achieved this benefit by having not experienced the morbidity of general anesthesia. Although such possibilities may be less likely than the one favored by the authors, they nonetheless provide explanations, which cannot be discounted by this study, as to how general anesthesia may have influenced the results. The fact that analgesic consumption in a third group, who received only general anesthesia, was no greater than in the combined general/epidural anesthesia group, again supports the possibility that the differences between the first two groups could have been due to merely the presence or absence of general anesthesia, rather than the epidural anesthetic.

Shir *et al.* relate their study to the investigation of preemptive analgesia. As discussed by McQuay,² many early studies into this phenomenon were limited by their design. The demonstration of a preemptive effect from an intervention before surgery requires the

control of the same intervention made after surgery, with all other factors equal in both groups. In the study by Shir *et al.*, none of the groups had epidural anesthesia started after the onset of surgery, nor were other factors equal in both groups (as discussed above), and yet the authors allude to a demonstration of preemptive analgesia.

The potential preemptive effects of epidural anesthesia have been studied by Pryle *et al.*³ in women undergoing total abdominal hysterectomy. In accordance with the design described by McQuay, they included two groups, both of whom received combined epidural/general anesthesia but with epidural blockade delayed in one group until after surgical trauma had taken place. Their study did not demonstrate a preemptive effect, although the results of Shir *et al.* might suggest that this could have been because of an inadequately extensive block.

As stated by Shir *et al.*, previous studies into preemptive analgesia have provided controversial results. Unfortunately, their own study is no exception.

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References

1. Shir Y, Raja SN, Frank SM: The effect of epidural *versus* general anesthesia on postoperative pain and analgesic requirements in patients undergoing radical prostatectomy. *ANESTHESIOLOGY* 80:49–56, 1994
2. McQuay HJ: Pre-emptive analgesia. *Br J Anaesth* 69:1–3, 1992
3. Pryle BJ, Vanner RG, Enriquez N, Reynolds F: Can pre-emptive lumbar epidural blockade reduce postoperative pain following lower abdominal surgery? *Anaesthesia* 48:120–123, 1993

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In Reply:—Cohen expresses concern that we failed to discuss alternate mechanisms that might explain our observation that the postoperative analgesic demand was greater in the general anesthetic (GA) and the combined epidural/general anesthetic groups (EG) when compared with the epidural anesthetic (EA) group.¹ Cohen's argument of psychologic factors and the “morbidity” associated with general anesthesia as confounding factors is intriguing. However, in

our opinion, these factors are unlikely to be the predominant explanation for the differences we observed in postoperative analgesic requirements between the different groups.

Regarding the psychologic effect of maintaining awareness during the surgical procedure, all patients had prior operating room exposures during prostatic biopsies, the majority of which were performed under regional anesthesia. In addition, patients in the EA

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group had minimal recall of intraoperative events, possibly from the amnestic effects of midazolam. Hence, the argument that lower analgesic requirement in the EA group may be secondary to "stoicism" from having experienced the operating room is unlikely to explain the results. The observations that the pain intensity scores and the duration of analgesic use in the three groups were similar provide additional, although indirect, evidence that psychologic factors were unlikely to have a confounding effect. Studies specifically designed to determine the effects of intraoperative awareness under regional anesthesia as a factor influencing postoperative pain may need to be conducted to test Cohen's hypothesis.

The argument that the differences between the EA group and the other two groups (EG and GA) are due to merely the presence or absence of general anesthesia is an interesting one. In contrast to the EA group, the GA and EG groups received intraoperative opioids and inhalation anesthetics. Both opioids as well as inhalational anesthetics depress the response of dorsal horn multireceptive, wide dynamic range (WDR) neurons to noxious stimuli.^{2,3} Thus, it may be expected that these agents would suppress the sensitization of the central neurons that are considered to play a role in nociceptive processing. However, our observations were contrary to these expectations. We are not aware of any reports to support Cohen's view that "the morbidity of general anesthesia" increases the postoperative analgesic requirements.

Although the observations in this study may have important implications in evaluating the results of earlier studies on preemptive analgesia, the principal aim of this study was not to prove or disprove the phenomenon of preemptive analgesia. As clearly stated, our primary goal was to determine whether the intraoperative anesthetic technique influences postoperative analgesic requirements when postoperative analgesia was well controlled (using patient-controlled analgesia) and objectively measured. We agree with Cohen that the true demonstration of a preemptive effect of an intervention would require a comparison of the same intervention, *i.e.*, epidural anesthesia, before and after surgery. However, in our opinion, although such a paradigm has important mechanistic implications, it has limited practical application. To avoid thromboembolic complications and minimize postoperative complications, our patients are out of bed within a few hours of discharge from the postanesthesia recovery unit. Hence, we found it difficult to justify a change in clinical practice

that would entail initiation of an epidural anesthesia after surgery. We were more interested in determining whether the anesthetic regimens commonly used in clinical practice influenced postoperative analgesic requirements. We have avoided making claims that our study provided evidence for preemptive analgesia, but have used our observations to suggest a possible explanation for the discrepancies in clinical studies relating to preemptive analgesia.

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References

1. Shir Y, Raja SN, Frank SM: The effect of epidural *versus* general anesthesia on postoperative pain and analgesic requirements in patients undergoing radical prostatectomy. *ANESTHESIOLOGY* 80:49-56, 1994
2. Dohi S, Toyooka H, Kitahata LM: Effects of morphine sulfate on dorsal-horn neuronal responses to graded noxious thermal stimulation in the decerebrate cat. *ANESTHESIOLOGY* 51:408-413, 1979
3. Namiki A, Collins JG, Kitahata LM, Kikuchi H, Homma E, Thalhammer JG: Effects of halothane on spinal neuronal responses to graded noxious heat stimulation in the cat. *ANESTHESIOLOGY* 53:475-480, 1980

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