Heel Sores in Association with Prolonged Epidural Analgesia

To the Editor:—Increasing awareness of the shortcomings of conventional postoperative analgesia has led to a search for alternatives to intramuscular narcotics. Many regional techniques have been used with success in this situation, including epidural analgesia. We have used continuous epidural infusions of bupivacaine for analgesia following knee replacement in more than 60 patients with excellent results.[1] We would, however, like to report an unusual complication.

The patient was a 68-year-old woman with rheumatoid arthritis admitted for total left knee replacement. This was carried out uneventfully under epidural analgesia with the blockade extended into the postoperative period by an infusion of bupivacaine 0.25%. The infusion was continued for a total of 5 days, during which time the infusate concentration was reduced progressively to 0.1% bupivacaine. This produced total pain relief for the duration of the infusion. The patient made excellent progress, such that the surgical team decided to proceed straightaway to knee replacement on the contralateral side. A similar technique was used for surgery and postoperative analgesia, but on this occasion the block was partially unilateral and the total analgesia of the first operation was more elusive. The patient continued to receive 0.25% bupivacaine, which produced a dense motor block in both legs. When the infusion was terminated on the fifth day, the patient complained of pain in both heels. On examination it was noticed that she had extensive pressure blisters develop on the dorsum of both heels because of the immobility engendered by the dense motor block. These were treated with dry dressings and subsequent incision and the patient was discharged home on the fifteenth postoperative day with the ulcers dry and healing well.

Pressure sores can develop in any dependent area immobile from whatever cause. This is most often paralysis due to neural dysfunction, either central or peripheral, and in this situation there is considerable awareness of the need for appropriate nursing care of pressure areas. Although we had noticed the development of motor blockade in our patient, neither the medical or the nursing staff had taken the appropriate precautions to avoid the development of pressure blisters.

As continuous epidural analgesia finds greater applications and is utilized more extensively, impeccable care of pressure areas must be practiced if sores and blisters are to be avoided in the face of dense motor blockade.

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An Even Simpler Way to Determine Drug Infusion Rates

To the Editor:—I read with interest the letter by Professor Tanaka,[1] and I agree that it is desirable to be able to read the dose of a drug infused from the numbers displayed on the infusion controller. I would like to suggest a simpler means of calculating the dose of a drug to be added to an infusion without reliance on nomograms or unwieldy formulae, such as have been suggested in this Journal.[1-3]

If the patient's weight is W kg, then by adding 6 times W in milligrams to a burette or infusion device, and making the volume up to 100 ml, then the setting of the drip controller in ml/h will be numerically the same as the dose of the drug administered in $\mu g \cdot kg^{-1} \cdot min^{-1}$.

If the infusion controller acts not as a volumetric pump, but as a drip counter, then again using the above dilutions and by using a drip set that delivers 60 drops/ml, then exactly the same result arises, *i.e.*, drops/min is equivalent to $\mu g \cdot kg^{-1} \cdot min^{-1}$ numerically.

Example: If in a 70-kg man, one wishes to infuse a drug at 5 $\mu g \cdot kg^{-1} \cdot min^{-1}$, add 6 × 70 mg of drug to device and make up to 100 ml. Set device at 5 ml/h, or if using a 60 drop/ml burette, 5 drops/min.

If one wishes to halve the initial infusion volume, then one can half the dose of drug to the solvent and, similarly, one can increase the volume and dose of drug added while maintaining the same concentration. This would enhance