3. Meakin G, Baker RG, McKiernan EF: Dose-response curves for suxamethonium in neonates, infants and children (abstract). Br J Anaesth 61:105, 1988
4. Van Der Spek AFL, Fang WB, Ashton-Miller JA, Stohler CS, Carlson DS, Schork MA: Increased masticatory muscle stiffness during limb muscle flaccidity associated with succinylcholine administration. ANESTHESIOLOGY 69:11–16, 1988

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Patient-controlled Analgesia (PCA)

To the Editor:—To date, there are no reports of severe respiratory depression with catastrophic outcome following PCA. Two cases of respiratory depression following PCA with morphine were mentioned in a recent correspondence.[1] The safety record of PCA machines has been excellent. There is also one report of two mishaps both due to human error.[2]

My concern regarding safety is the current introduction of a choice of modes increasingly offered by manufacturers. Three modes are available: 1) PCA; 2) continuous; or 3) continuous plus PCA. Whenever the continuous or continuous plus PCA mode is used, a danger of overdose is present.

With the PCA mode, patients are given a pre-assessed individualized loading dose to create analgesia. They are taught to titrate potent opioids by pressing a button on a hand-held pendant. The physician sets the PCA machine to deliver a small dose of opioid. When the button is pushed and released, the small dose is delivered intravenously. A preset, lockout interval also limits the maximum dose the patient may receive. With experience with more than 18,000 postsurgical patients, we have utilized a low dose of morphine (1 mg) or meperidine (10 mg) for the patient dose followed by a lockout period of 6 min. The maximum hourly patient-controlled dose is 10 mg of morphine or 100 mg of meperidine. Some patients push the button frequently, while others require only occasional bolus doses. If excessive sedation or somnolence occurs, the patient does not push the button. At Magee-Womens Hospital, severe respiratory depression has not occurred using either morphine or meperidine.

We foresee problems with the continuous mode plus PCA. The manufacturer's recommended continuous dose is 1–3 $mg \cdot h^{-1}$ morphine, which may be dangerously high for some patients. At Magee-Womens Hospital following abdominal hysterectomy patients receiving 0.5 $mg \cdot h^{-1}$ morphine have slept well during the night *without having to activate the machine,* in other words, no additional boluses are required. When a continuous plus PCA mode is prescribed, the safe and effective setting of the continuous dose is an estimate by the prescribing physician. *If the patient does not use PCA with continuous, the continuous dose is too high. If the patient needs frequent PCA boluses, the continuous dose is too low.*

In many hospitals, the prescribing physician is not in-house during the night. The nursing staff is responsible for monitoring prescribed patient care by following doctor's orders and nursing protocols. Assessment of the hourly level of consciousness is advocated in some institutions and used as a monitoring tool.[3] Somnolence should precede respiratory depression for patients using PCA and the patient does not push the button. However, if the continuous plus PCA mode is being used, the continuous dose must be less than the patient requires. In our opinion, some patient use of PCA is essential to prevent overdose from the prescribed continuous dose.

We suggest that when the patient is utilizing the continuous plus PCA mode, nursing staff must confirm that the patient is using some PCA. Nursing orders for the above mode could be made to preempt the state of somnolence. For example, "If no patient activation during the last hour, reduce continuous dose by 0.2 $mg \cdot h^{-1}$. If patient activation exceeds 4 per hour, increase continuous dose by 0.2 mg/h." Individual variation may require more than 0.2 mg reduction/increase of the continuous dose for morphine for some patients and would be prescribed by the physician.

In conclusion, the danger of opioid overdose is ever present when the continuous mode is used. When continuous plus PCA mode is used, patient use of PCA must be monitored to maintain the excellent safety record pure PCA machines have established.

RAY MCKENZIE, M.D.
Chief of Anesthesiology
Professor of Anesthesiology
University of Pittsburgh
School of Medicine
Forbes Avenue and Halket Street
Pittsburgh, Pennsylvania 15213

REFERENCES

1. Hammonds WD, Hord AH: Additional comments regarding an anesthesiology-based postoperative pain service. ANESTHESIOLOGY 69:139, 1988
2. White PF: Mishaps with patient-controlled analgesia. ANESTHESIOLOGY 66:81–83, 1987
3. Ready LB, Chadwick HS, Wild LM: In Reply: Additional comments regarding an anesthesiology-based postoperative pain service. ANESTHESIOLOGY 69:139–140, 1988

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An Illuminating Suggestion

To the Editor:—In a recent letter, Kubota *et al.*[1] describe the illumination of the vocal cords by holding a pencil torch at the mouth, in the event of laryngoscope light failure. We would like to make the following suggestions. First, there should always be two laryngoscopes available. Second, the technique they describe may be refined in the following manner. The larynx should be transilluminated anteriorly

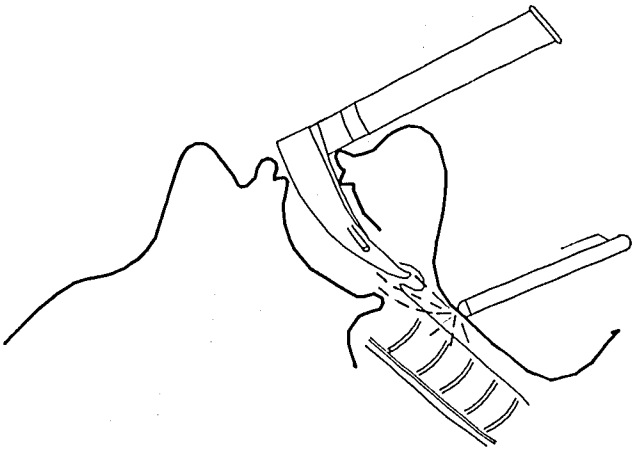

FIG. 1. An assistant holds the pencil torch on the skin over the cricothyroid membrane.

through the cricothyroid membrane (fig. 1). This gives good illumination of the cords and larynx and overcomes the problem of the torch obstructing the view of the larynx at intubation.

We feel this modification is less cumbersome and would only require the assistance of untrained personnel to hold the torch.

PAUL R. SAUNDERS, F.F.A.R.C.S.
Visiting Assistant Professor
PAUL J. BRAS, F.F.A.R.C.S.
Visiting Assistant Professor
S. MAIRE MCCARROLL, F.F.A.R.C.S.I.
Visiting Assistant Professor
Department of Anesthesiology
Southwestern Medical Center at Dallas
5323 Harry Hines Boulevard
Dallas, Texas 75235

REFERENCE

1. Kubota Y, Toyoda Y, Kubota H: Endotracheal intubation assisted with a pencil torch. ANESTHESIOLOGY 68:167, 1988

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69:1028, 1988

DDAVP to Reduce Blood Loss in Jehovah's Witnesses

To the Editor:—In their remarkable case report, Lichtenstein *et al.* employed hypothermia, isovolemic hemodilution, general anesthesia, and paralysis to reduce oxygen consumption and sustain life during a period of extraordinarily low arterial oxygen content.[1] In addition, the case demonstrates the large amount of reserve built into the normal oxygen transport system.

DDAVP (desmopressin) has been employed to reduce bleeding after cardiopulmonary bypass.[2] DDAVP also reduces bleeding time in normal persons and has been used to reduce bleeding in patients undergoing Harrington Rod insertion.[3] Doses of 0.3 μg/kg given intravenously over 20 min have been used. If severe intraoperative bleeding is a possibility in a Jehovah's Witness patient, the prophylactic administration of DDAVP to reduce bleeding may be reasonable. This measure may make the occurrence of single digit hematocrits less likely in these patients.

DAVID J. STONE, M.D.

COSMO A. DIFAZIO, M.D.

Department of Anesthesiology
University of Virginia Medical Center
Charlottesville, Virginia 22908

REFERENCES

1. Lichtenstein A, Eckhart WF, Swanson KJ, Vacanti CA, Zapal WM: Unplanned intraoperative and postoperative hemodilution: Oxygen transport and consumption during severe anemia. ANESTHESIOLOGY 69:119–122, 1988
2. Salzman EW, Weinstein MJ, Weintraub RM, Ware JA, Thuser RL, Robertson L, Donovan A, Gaffner T, Bestele V, Troll J, Smith MS, Chute LE: Treatment with desmopressin acetate to reduce blood loss after cardiac surgery. N Engl J Med 314: 1402–1406, 1986
3. Kobrinsky NL, Letts RM, Patel LR, Israels ED, Monson RC, Schwetz N, Cheang MS: I-desamino-8-D-arginine vasopressin (desmopressin) decreases operative blood loss in patients having Harrington Rod spinal fusion surgery. Ann Intern Med 107: 446–450, 1987

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Reconstitution of Dantrolene

To the Editor:—There are a variety of containers that can be used to prepare intravenous infusions of reconstituted Dantrium®. However, when large volumes are prepared (usually for prophylaxis, preoperatively), only evacuated plastic bags are recommended. In addition, Hargrove[1] has successfully employed a large bottle of sterile water for injection; this should not contain preservatives.

One type of container that is not recommended for the preparation of Dantrium iv® is a sterile, evacuated glass bottle. Some of these vessels contain a buffer (*e.g.*, acetate), which is a residue from the sterilization process. There are rare reports of precipitation of dantrolene in these bottles due to the alteration of *p*H of the solution by the residual buffer.

A. W. FOX, M.D.

H. E. CAMPBELL, PHARM.D.
Norwich Eaton Pharmaceuticals, Inc.
P. O. Box 191
Norwich, New York 13815-0191

REFERENCE

1. Hargrove JC: Are we really prepared for malignant hyperthermia? II. ANESTHESIOLOGY 68:815, 1988

(Accepted for publication August 26, 1988.)