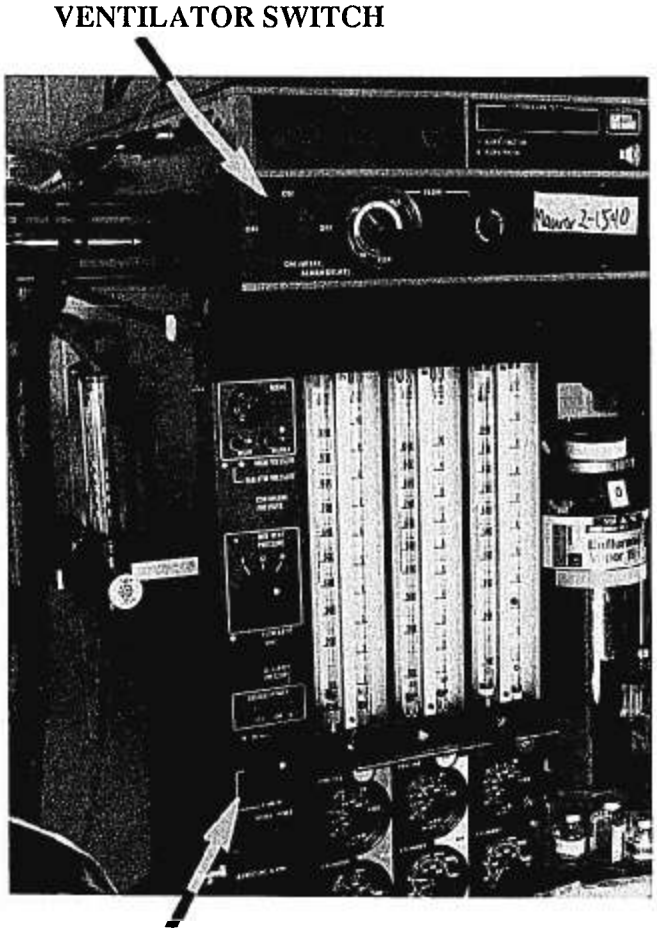

FIG. 1. Drager model 2A anesthesia machine controls.

of oxygen by the patient. Since the integral oxygen analyzer was attached to the main switch of the Drager machine, no audible alarm sounded indicating a low FI_{O_2}. There was no loss of oxygen supply to the machine; therefore, the oxygen-pressure loss alarm did not sound. The circle system was intact, with hand ventilation continuing, and thus the capnograph appeared normal. The error was noticed when it was observed that the flow meters registered zero flow.

The Perkin Elmer mass spectrometer eventually would have alarmed when the FI_{O_2} decreased to less than 0.19, but depending on the number of active operating rooms, this might have taken 3–4 min. The digital display for the pulse oximeter on the Marquette monitor certainly would have flashed when the saturation decreased to less than 90%. But with our current software, the audible alarms on the pulse oximeter must be activated manually. This now has been changed, since redundant alarm systems are essential for maximum safety.

Certainly, the best way to avoid a serious problem is to ensure that the anesthetist is a well trained and vigilant. There really will never be a substitute for this essential element of patient safety.

However, equipment manufacturers need to keep in mind the benefits of designing critical controls and switches so that they do not turn in the same manner or have the same "feel." In fact, the newer Drager model 2B has incorporated changes to avoid the above-mentioned problem. In addition, serious consideration should be given to the current trend of packaging all monitors into one integrated system, if that entire system (including alarms) is controlled by one power supply switch.

WALTER G. MAURER, M.D.
Staff Anesthesiologist
The Cleveland Clinic Foundation
9500 Euclid Avenue
Cleveland, Ohio 44106

(Accepted for publication April 16, 1991.)

Anesthesiology
75:168, 1991

Spinal Anesthesia in Infants: Could a L5–S1 Approach Be Safer?

To the Editor:—Recently Wright *et al.*[1] described four cases of high spinal anesthesia in former premature infants. The authors highlighted factors related to the extension of the block, *i.e.*, baricity, position, total dose, volume of cerebrospinal fluid, volume of the anesthetic solution, and the rate of injection. However, we believe that in neonates the level at which dural puncture is performed plays a crucial role in governing the height of the spinal block. In all the infants, lumbar puncture was performed in the L3–L4 interspace.

Wright *et al.*[1] stated that because the spinal cord and canal in infants are much shorter than in adults, small differences in the extent to which the solution ascends with injection could make a significant difference in the height of the block. We agree and suggest that a low approach, such as below the intercristal line (which in neonates is mainly L5–S1[2]), may reduce the possibility of high spinal blockade.

In addition, lumbar puncture at L3–L4 increases the risk of damaging the spinal cord, which is said to extend further caudad in small children.

PAOLO BUSONI, M.D., L.D.
Professor of Anesthesiology

ANDREA MESSERI, M.D.
Department of Anesthesia and Intensive Care
A. Meyer Children Hospital
Firenze, Italy

REFERENCES

1. Wright TE, Orr RJ, Haberkern CM, Walbergh EJ: Complications during spinal anesthesia in infants. High spinal blockade. ANESTHESIOLOGY 73:1290–1291, 1990
2. Busoni P: Anatomy, Regional Anaesthesia in Children. Edited by Saint-Maurice C, Shulte Steinberg O. Norwalk, Appleton & Lange, 1990, pp 16–25

(Accepted for publication April 18, 1991.)