

mercially available bottled fruit extract contains small amounts of ethyl-alcohol as a solvent, and it is known that alcohol vapor affects the accuracy of the readings.²

As seen in figure 1, a falsely high anesthetic reading will be recorded by the "Normac."

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A Simple and Effective Method for Stopping Post-anesthetic Clonus

To The Editor:—During recovery from general anesthesia, patients often exhibit neurological changes that, in pathological states, are associated with lesions of the pyramidal tract.¹ Sustained muscular hypertonicity is reported to occur in 38% of patients, and commonly involves the masseters, pectorals, adductors, and flexors of the upper limbs, and the extensors of the lower limbs.² Clonus is frequently superimposed at the ankle, knee, and elbow.

Many drugs have been advocated to stop or prevent this post-anesthetic clonus. Methlphenidate (Ritalin®),³ a psychomotor stimulant with sympathomimetic effects, is effective in 50% of the cases, but can have alarming cardiac side-effects.⁴ Orphenadrine,⁵ magnesium sulfate,³ and calcium chloride³ have also been used, with reported success rates within 5 min, of 57%, 61%, and 28%, respectively.

Clonus results from reflex activity at the level of the spinal cord. When a sudden stretch is put on a group of muscles, these muscles reflexly contract vigorously and, in so doing, stretch their antagonists which, in turn, reflexly contract, stretching the first group, and so forth. This self-perpetuating reflex activity can be very simply terminated by elongating one group of muscles and shortening their antagonists. For example, with lower limb hyperactivity, if steady force is exerted to almost completely flex the knees, the initially increased resistance suddenly melts away. The clonus disappears and does not recur if the leg is kept in the flexed position.

This so-called "clasp-knife" response is a feature of the pyramidal syndrome, and is explained by the stimulation of the Golgi tendon organs, producing excitatory post-synaptic potentials on interneurone cells, which then discharge over a short axonal pathway, releasing an inhibitory transmitter on the agonist motoneurone.⁶

We tried this technique on ten patients (8-18 yr old) with post-anesthetic clonus. Flexion of the knees consistently and immediately stopped the clonus in all patients. Extension of the forearms at the elbows was successful in six patients (60%).

In conclusion, this physiologic maneuver to stop post-anesthetic clonus does not involve any pharmacological intervention and is effective, thereby facilitating post-anesthetic care, and preventing the increase in oxygen consumption associated with muscular activity at a time when the respiration and the cardiac output may be depressed by residual anesthetic action.

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