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REFERENCES
(Accepted for publication July 10, 1985)

Open Eye Injuries

To the Editor:—Libonati et al.'1 have confirmed what I believe many anesthesiologists have known or felt for many years: a careful rapid-sequence induction using succinylcholine is the safest total patient care approach to an open eye injury in a patient with a full stomach. Other studies concerning intraocular pressure and succinylcholine have neither accurately simulated the conditions of a rapid-sequence induction nor examined the effects on an open decompressed globe.

Some time ago I attempted to approach this problem from the decision analysis point of view. In doing so I gathered some interesting data that may further support the use of succinylcholine. The 10 ophthalmologists I interviewed agreed that only a small percentage of patients with penetrating eye injuries recovered any useful sight in the injured eye. Among 27 patients who had lost sight in one eye, only two considered monocular vision a handicap.

Using decision analysis, as one would expect, the basic issue became the balance between the probability of worsening the eye injury and the ultimate consequences thereof and the probability of aspiration pneumonitis and its consequences. With all the reasonable probability and utility assignments I could make, the decision to use succinylcholine in a rapid-sequence induction was always favored. Unfortunately, I did not have enough hard numbers to ensure the validity of the decision analysis.

We are fortunate that Libonati et al. have published their results. They may save more lives and prevent more morbidity than many of the esoteric articles we read.

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REFERENCE
(Accepted for publication July 10, 1985)

Problems in Interpreting Gastric Pressure Measurements

To the Editor:—The article by Dureuil et al.1 concerning the effects of aminophylline on breathing in patients after abdominal surgery is of interest but difficult to interpret. This is partly because their results are expressed as changes, such as ΔPga, the difference between gastric pressure at end-inspiration and gastric pressure during...
expiration. It would be interesting to know if the absolute gastric pressure was different before and after operation or before and after drug therapy, since abdominal muscle activity could account for some of the observations. The work that the authors quote with regard to abdominal muscle activity is in patients with respiratory failure and is hardly relevant to their own observations. The influence of aminophylline seems to have been to alter the change in gastric pressure during inspiration from −1 to +1.2 cmH₂O.

This could have been partly the result of a change in the pattern of abdominal muscle action, for example, a reduction in tonic activity (spasm due to pain) or a loss of expiratory activity. In another circumstance, we have found a decrease in Pga on inspiration, in patients breathing spontaneously during anesthesia, of the same order of magnitude. We attributed this to expiratory abdominal muscle activity. However, it is clear that if ΔPpl does not change, and ΔPga increases, that ΔPdi will increase, indicating a more forceful contraction of the diaphragm. This would be expected from the known actions of aminophylline. However, changes in Pga depend on the extent of use of the abdominal and rib-cage muscles as well as the diaphragm, and, unless an attempt is made to assess the action of these muscle groups, the pressure data presented cannot be reliably interpreted as an indication of an action on the diaphragm alone.

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(Accepted for publication July 22, 1985.)

In reply: Dr. Drummond is questioning the change in the difference between gastric pressure at end-inspiration and gastric pressure during inspiration (ΔPga) as a reliable parameter to assess the contribution of the diaphragm to quiet breathing. He suggests that abdominal muscle contraction may occur after upper abdominal surgery and could influence ΔPga. According to his comment, changes in absolute gastric pressure (Pga) would be a better index to reflect the expiratory abdominal muscle activity. Although, negative changes in Pga during inspiration might be related to expiratory relaxation of abdominal muscles, Pga also can be altered by other factors such as pneumoperitoneum. Few data regarding abdominal muscle activity after upper abdominal surgery are available at this time, and it may be questionable to compare respiratory muscle activity occurring during general anesthesia with that after upper abdominal surgery. In addition, absence of abdominal muscle contraction after upper abdominal surgery was reported by Simmoneau et al. in patients developing negative ΔPga.

As stated by Ford et al., any reduction in ΔPga after upper abdominal surgery, without any change in pleural pressure (ΔPpl), indicated a decrease in diaphragmatic contribution to tidal volume. Conversely, any increase in ΔPga, without change in ΔPpl, indicates an increased contribution of the diaphragm to breathing. Therefore, during quiet tidal breathing, ΔPpl determines tidal volume, whereas any contribution from the diaphragm is directly reflected by ΔPga. Thus, we can conclude that an increase in the ratio of ΔPga to transdiaphragmatic pressure (ΔPdi) is well related to the effects of aminophylline on the diaphragm alone.

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(Accepted for publication July 22, 1985.)