

Dr. Nahas devotes a major part of his letter to a defense of THAM, concerning the usefulness of which I have serious doubts, but which is hardly a central point of the review. The reader who wishes to pursue the fine points of this controversy should refer to the paper by Bleich and Schwartz.<sup>2</sup>

Finally, we come to the issue of whether to treat the blood or treat the patient; it is clear that the routine addition of bicarbonate or THAM to blood will further add to the already predictable metabolic alkalosis which follows massive transfusion of ACD blood. There are many who consider the high serum sodium and metabolic alkalosis following multiple transfusions of ACD blood (i.e., for open heart surgery) undesirable. Cardiopulmonary bypass and other less massive transfusions are not necessarily accompanied by acidosis, as Dr. Nahas seems to believe, and when acidosis does occur, the severity cannot be predicted in advance. Therefore there can be no justification for the routine addition of alkalinizing agents to transfused blood. Dr. Nahas correctly states that "titration of acidemia in pa-

tients is a . . . delicate empirical procedure, because the amount of titratable acid to be neutralized is impossible to assess accurately." If it is difficult to detect the severity of acidosis which already exists, it is impossible to predict before it occurs. The conclusion to be drawn is that the physician who wishes to engage in the heroic procedures for which massive transfusion is necessary must be prepared to make the "delicate, empirical" measurements (i.e., serial measurement of pH and blood gases) which will provide moment-to-moment information concerning the patient's acid-base status.

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#### REFERENCES

1. Nahas, G. C.: Acid-Base Balance, letter to the Editor, *ANESTHESIOLOGY* 28: 787, 1967.
2. Bleich, H. L., and Schwartz, W. B.: Tris buffer (THAM): An appraisal of its physiologic effects and clinical usefulness, *New Eng. J. Med.* 274: 782, 1966.

### Surgery

**HEART SURGERY** Open heart surgery has been characterized by the need for large amounts of fresh heparinized blood, and the relatively great risk of complications due to transfusion. A disposable plastic oxygenator, primed with 5 per cent dextrose in distilled water, 20 to 30 mg./kg., was used in over 1,800 patients. When transfusions were needed, ACD blood was used. No blood was used in 157 patients, whose operations were: repair of atrial septal defect, 77; repair ventricular septal defect, 30; mitral valve replacement, 17; other, 33. Eleven patients belonged to the Jehovah Witness faith. The authors emphasize that blood transfusions may cause complications, and that open heart operations can be done with the use of much less blood than was expected. (Beall, A. C.: *Open Heart Surgery Without Blood Transfusion*, *Arch. Surg.* 94: 567 (April) 1967.)

**MYOCARDIAL INFARCTION** In the early post-operative period, myocardial infarction is difficult to recognize. It should be suspected when the ECG differs from the preoperative tracing, involves the ST segment, shows persistent and unexplained sinus tachycardia, and the changes are progressive. Enzyme studies also help in establishing the diagnosis; if SGOT and LDH are elevated due to liver trauma, SGPT is also elevated. Elevation of SGOT and LDH, but normal SGPT suggest myocardial damage. This coupled with even borderline ECG change, strongly suggests myocardial infarction. (Kelley, J. L., Campbell, D. A., and Brandt, R. L.: *The Recognition of Myocardial Infarction in the Early Postoperative Period*, *Arch. Surg.* 94: 673 (May) 1967.)