

## Reports of Scientific Meetings

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At the Fifth Postgraduate Seminar sponsored by the Departments of Anesthesiology of the medical schools of Miami and Florida, the subject discussed was "Recent Advances in Local Anesthetics and Regional Anesthesia." This was timely, for regional anesthesia is still of vital importance even though it is often neglected in modern practice for lack of knowledge or failure to master the art. Since much of the material was in the nature of a review, only the relatively new points and matters of controversy will be emphasized here.

In the session on pharmacology, S. Tetlow of Gainesville spoke of his work on the antibacterial action of local anesthetics, designed to elucidate the mechanism of action of these agents. Using cultures of *E. coli* as a model system and taking into account the influence of pH, anesthetics were selected on the basis of structure and dissociation constants, with concentrations in the clinical range. A definite correlation was found between antibacterial action and anesthetic activity. Inhibition of colony growth was affected by pH: the higher the pH and therefore the lower the degree of ionization, the greater the inhibition of growth. Although this would imply that the uncharged molecule is active in local anesthesia, other work presented at this seminar suggested a different interpretation. N. B. Anderson, also from Gainesville, presented his studies on the effects of local anesthetics on the erythrocyte, since resting membrane potential and permeability in nerve and erythrocyte have much in common. To distinguish the effects of ionization upon sodium and potassium flux, experiments were carried out at pH's of 6.0, 7.4, and 8.0. At pH 6.0 the anesthetic cation inhibited sodium flux, sug-

gesting that this is the active form of the molecule. Subsequently, J. M. Ritchie of New York gave the results of his studies of local anesthetic action on the desheathed vagus nerve of the rabbit. These experiments permit separation of physicochemical factors influencing penetration of tissues from true anesthetic activity. The data clearly showed that the cationic form is more active at the theoretical receptor site of the membrane, while the seemingly greater efficacy of local anesthetics in alkaline solution may be attributed to better penetration by the uncharged molecule through diffusion barriers. However, this does not imply that the uncharged form is inactive or that the charged form alone is essential for anesthetic action.

R. H. DeJong of Seattle presented traditional concepts of the sites and modes of action of local anesthetics, while N. M. Greene of New Haven reviewed the metabolism of the different structural types of anesthetics and their distribution in the body relative to lipid solubility. Ester compounds are inactivated in liver and plasma by cholinesterases, whereas the non-esters, lidocaine, dibucaine and mepivacaine, are altered in hepatic microsomal enzymes which require both oxygen and NADP. J. Adriani of New Orleans narrated the observations he had made over the years on factors that influence the blood levels of local anesthetics, hence their systemic toxicity. P. R. Bromage of Montreal then gave a resumé of the knowledge of newer local anesthetics. The action of mepivacaine in the absence of adrenalin, although longer-lasting than that of lidocaine, is little different from the latter when adrenalin is used with either compound. Prilocaine, more readily-metabolized than lidocaine and therefore less toxic, produces methemoglobinemia, which should preclude its extensive clinical use. Compound LAC-43 (marcaine) in equipotent dosage is less reli-

able and has shown little increase in duration over lidocaine, but it holds promise for prolonged relief of pain during labor. In Bromage's experience, compared with the hydrochloride salts, carbonated compounds have resulted in approximately a 30 per cent prolongation of effect. Exploration of the complex molecule of tetrodotoxin could lead to a novel and perhaps better local anesthetic than those now available. In conclusion, Bromage noted that more might be gained by adjusting the ionic environment of the nerve membrane than by preoccupation with new compounds.

In a panel on pain, J. J. Bonica of Seattle explored the ramifications of the Melzack and Wall "gateway" theory of pain. H. K. Beecher of Boston described the principles underlying the rational use of narcotics, and H. L. Rosomoff of New York presented the results of treatment of intractable pain derived from 465 percutaneous cordotomies. Although the report was impressive, the complications were not outlined clearly and the failure of other neurosurgeons to adopt this simpler approach was not explained. B. S. Goldstein of Miami touched upon the psychiatric aspects of management of pain, and D. C. Moore of Seattle, in a dissertation on neurolytic agents for nerve block, endorsed a cautious and conservative approach to this form of therapy.

In a discussion of physiologic problems, J. E. Steinhaus of Atlanta grouped the cardiovascular effects of local anesthetics according to antiarrhythmic and myocardial depressant patterns. A favorable ratio between antiarrhythmic properties and cardiovascular depression has led to the extensive use of lidocaine in anesthesia for cardiovascular surgery, in coronary care units, and in resuscitation. Although enthusiastic about the technique, J. E. Usubiaga of Miami could not offer quantitative data to support the use of intravenous local anesthetics as an adjunct to general anesthesia. In his experience, lidocaine given intravenously has proven effective in the prevention of the arrhythmias associated with electroshock therapy for psychosis. However, the influence of the central action of lidocaine upon the therapeutic effects of the shock has not yet been defined.

A rewarding discussion of recent concepts of regional anesthesia for obstetrics brought out the dilemmas in this area. S. M. Shnider of San Francisco presented conflicting data derived from animals and man on the effects of vasopressors on the uterus, some causing an increase in uterine muscle tone with a decrease in blood flow, others not—with obvious implications for oxygenation and acid-base balance in the fetus. On the maternal side, it seems now that the use of synthetic oxytocics to manage bleeding is not contraindicated when vasopressor drugs have already been given. Since local anesthetics in high concentration may cause cardiovascular depression in the fetus, P. R. Bromage gave a resumé of the factors influencing placental transfer of drugs. W. A. Little of Miami spoke of the few ill effects on the fetus of paracervical nerve block for pain relief during labor; there was an incidence of unexplained bradycardia of approximately 20 per cent. B. E. Smith of Miami illuminated the controversy over the choice of spinal vs. general anesthesia for cesarian section. While general anesthesia with nitrous oxide and succinylcholine has gained in popularity and the performance of spinal anesthesia is better through understanding of the effects of hypotension and vasopressors on the fetus, there has been no adequate comparison of the two methods.

In a concluding session on spinal and epidural anesthesia, the currently-accepted mechanisms of local anesthetic action were reviewed, effects on circulation and respiration were compared, reasons for spinal failure hypothesized, and the ever-present hazard of development of neurologic sequelae emphasized. This was a good opportunity to contrast the two methods of anesthesia, spinal and epidural, based on the personal experiences of the panelists, Greene, Bromage, Usubiaga, DeJong and L. D. Vandam of Boston. All agreed that, despite its drawbacks, the simplicity and accuracy of spinal anesthesia have caused it to survive.

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