Radiofrequency Neurolysis in a Clinical Model

TO THE EDITOR: In the August issue of the Journal of Neurosurgery, Drs. Smith, McWhorter, and Challa have presented a well documented paper on radiofrequency (rf) lesions of the spinal root of the dog (Smith HP, McWhorter JM, Challa VR: Radiofrequency neurolysis in a clinical model. Neuropathological correlation. J Neurosurg 55:246–253, August, 1981). However, they failed to discuss the two papers dealing with the results of a study carried out in the Neurochirurgischen Klinik of Ziirich in 1973.1,2

Our results of rf lesions on the cat Gasserian ganglion are not completely in agreement with the data of Smith, et al. In effect, our data show that the heat generated in the ganglion by high-frequency rf currents affects conduction in all types of fibers in the root. The A delta and C fibers do appear to be more-sensitive to heat than the A alpha fibers, although in a manner not strictly inversely proportional to the diameter of the fibers.

The electron microscopic data from experiments on rf lesioning of the trigeminal ganglion (presented at the Second European Meeting of the Stereotactic and Functional Neurosurgery Society held in Madrid in 1975) did not reveal changes in myelinated fibers at temperatures below 60°C. However, at that temperature, alteration of the microtubules and neurofilaments was already present in unmyelinated fibers. Furthermore, at that temperature, the evoked A delta and C fibers compound action potentials from the dental pulp stimulation began to decrease considerably in the same animals (see Figs. 1, 3, and 5 of Reference 2).

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References

RESPONSE: We appreciate Drs. Broggi and Siegfried’s addition of their two elegant neurophysiological studies to our bibliography. One can only hope that their neuropathological correlation will also find its way into the literature.

Our results and those of Uematsu3 both demonstrated histologically that there was nonselective radiofrequency destruction of myelinated and unmyelinated fibers. This nonselective destruction was also demonstrated electrophysiologically by Klumpp and Zimmermann. It may be that if Drs. Broggi and Siegfried had examined their material pathologically at 1 to 6 weeks rather than immediately after the lesions were made, they would have seen myelin breakdown at temperatures lower than 60°C, since alteration of albumin structure begins at approximately 47°C. Thus, temperatures higher than 47°C should be expected to produce alterations in myelin structure, again as was shown by our and by Uematsu’s studies.

It would be of great interest to see if Drs. Broggi and Siegfried’s results remain selective on a long-term basis, or whether the tendency they report in their study for the A delta and C fibers to be more sensitive to radiofrequency lesions would disappear with time as the myelin in the A alpha and the beta cells broke down.

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References

Pineal Tumors in Children and Adolescents

Neurosurgical forum

1981, and all but one of my patients were in the pediatric age group.

My second concern is with the administration of cobalt radiation to pediatric patients suffering from brain tumor not verified histologically. Regarding this method of treatment, I have previously stated, "Our experience clearly indicates that the risks from blind radiotherapy are far greater than those from surgical intervention." I would like to indicate to the authors that it is always possible to back out from the surgical field, leaving behind a malignant or otherwise unremovable pineal tumor, and to change the course of action to a different modality of treatment. It is impossible to remove the effect of radiotherapy once it has been given.

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Reference

Response: Dr. Ventureyra appropriately draws attention to his excellent paper concerning the direct surgical approach to lesions of the pineal region. It was omitted from the references in our paper primarily because our literature search did not cover reports published after June, 1981. Dr. Ventureyra presents a thoughtful and well reasoned analysis of direct surgical approaches. What we propose is essentially identical in those cases where a direct approach is believed to be in the best interest of the patient. The fact that safe and effective direct surgery can currently be performed on pineal lesions is not, however, in dispute. Like many other recent surgical reports, Dr. Ventureyra's series has low operative mortality, relatively little morbidity, and a follow-up period that allows no reasonable conclusions to be drawn concerning the effect of direct surgery on the disease process.

The goal of our paper was to provide a standard against which other means of management of lesions presumed to be primary pineal tumors can be measured. Therapy with shunting and radiation proved to be extraordinarily free of adverse effects for our pediatric patients, even those who were ultimately found not to have primary pineal tumors, and the 62% long-term survival rate was gratifying. One hopes that those surgeons with large series of pineal tumors treated by direct surgery will follow their patients carefully and report their results at 5 and 10 years after treatment.

We must take exception to the undocumented statement that "blind" radiotherapy carries "far greater" risk than direct surgical intervention. Radiation therapy, given carefully in a competent unit with experience in treating children, offers essentially no risk to life and creates no serious immediate neurological sequelae. We wish this were true of neurosurgical operations in the pineal region, but it is not. We have been unable to find any case in which radiation therapy was properly given to a presumed primary pineal tumor where the radiation therapy was shown to produce death or neurological deficit. On the other hand, there are reports that suggest that direct surgery predisposes a patient to later dissemination of germinomas and pineoblastomas.1,2

Finally, one must question the objectivity of those surgeons who claim to have accomplished total excision of a surgically incurable lesion, whether it is a glioblastoma, a germinoma, or a pineoblastoma. It is precisely because these lesions cannot be cured with surgical excision that the burden of proof is on the advocates of direct surgery to show that the risk, the expense, and the discomfort of their approach is superior in the overall management of these lesions.

Another report of patients treated by direct surgery3 appeared after completion of our manuscript, and should also be acknowledged.

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References

Cerebellar Stimulation for Cerebral Palsy—Placebo

To THE EDITOR: In 1980, I reported a double-blind evaluation of eight patients who underwent cerebellar stimulation for cerebral palsy (Whittaker CK: Cerebellar stimulation for cerebral palsy. J Neurosurg 52:648–653, May, 1980). One of these patients was recently hospitalized for an orthopedic procedure on her legs for persistent spasticity. She has been using the stimulator for over 5 years, and her parents remain adamant that they see improvement when she uses the stimulator and deterioration when she does not use it. X-ray films of the implanted cable now show that all five strands of the wire are broken, and the ends are separated by about 2 inches. It seems extremely implausible that any physiological effect on neural function could occur from activation of the implanted coil over her chest. The most likely explanation of the attitude of this child's parents must be the placebo effect. Readers of the Journal may appreciate a reminder of the staying power of the placebo.

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