the practical point of view, we preferred the use of “ansa cervicalis branch of the hypoglossal nerve” in our article.

The infratemporal fossa is an irregular space behind the maxilla (10). However, there is some controversy as to the exact description of the infratemporal fossa. Some authors refer to the infratemporal fossa as the region below the greater wing of the sphenoid bone, lateral to the medial pterygoid muscle and the lateral pterygoid plate (4, 9), as Tubbs et al. pointed out. However, another group of authors describes the infratemporal region as the area under the floor of the middle fossa (1, 5, 8). In this more inclusive definition, the lower cranial nerves, sympathetic plexus, internal carotid artery, and internal jugular vein are included. Considering the major infratemporal surgical approaches, targeting the structures located in this area, we preferred to use the term “infratemporal fossa” for the location of the extracranial part of the GPhN.

Tubbs et al. mentioned in their comment that the somatic afferent fibers from the auricular branch of the GPhN terminate into the spinal trigeminal nucleus. However, connection of the GPhN with the nucleus of the spinal tract of the trigeminal nerve was expressed as a possibility in the classic textbook of anatomy (10). Therefore, we did not show this nucleus in Figure 12 in our article (7).

In conclusion, we again thank Tubbs et al. for their interest in and thorough analysis of our article. Their critique will motivate the reader to discuss the obscure and controversial subjects regarding the functional anatomy of the GPhN.

M. Faik Özveren
Uğur Türe
Elazığ, Turkey

Proton Magnetic Resonance Spectroscopic Imaging Can Predict Length of Survival in Patients with Supratentorial Gliomas

To the Editor:
We read with great interest the article by Kuznetsov et al. (4), which describes their brilliant work in using proton magnetic resonance spectroscopic (1H MRS) characteristics in predicting the length of survival in patients with supratentorial gliomas. It was apparent that their pioneering and well-designed retrospective study has significant clinical impact, because a noninvasive diagnostic modality could potentially predict the patient’s life expectancy in cases of supratentorial gliomas. We strongly believe that 1H MRS will not substitute for the “gold standard” of histopathological examination but will definitely add important preoperative information regarding the biochemical profile of an intracranial glioma. This preoperative information will enable the involved neurosurgeon to be well prepared for the tumor resection by having planned preoperatively any adjunctive treatment modalities.

We would like to add to these authors’ extensive experience some thoughts and observations from our limited experience with regard to the intracranial glioma 1H MRS analysis. Although metabolite ratios have been used extensively by different investigators in the spectroscopic analysis of intracranial tumors, the fact that the concentrations of both metabolites (numerator and denominator of the metabolite ratio used) could change concomitantly makes the interpretation of these changes less accurate, and sometimes drawing any conclusion on the basis of this change may be erratic. We think that the calculation of the absolute concentration of the measured metabolites could eliminate any potential for error and significantly increase the accuracy of the methodology of the present study. There are already commercially available, user-friendly, software packages that could easily be used for such calculations.

Regarding the use of the calculated metabolite ratios, we have found in our series that the choline/creatinine ratio was an accurate and reproducible malignancy marker, whereas the choline/N-acetylaspartate metabolite ratio was a nonreproducible one (1). We have also found that the choline/N-acetylaspartate ratio is nonspecific for histological grading of supratentorial solid astrocytomas (1). On the contrary, we have found that a strong correlation exists between the value of the choline/creatinine ratio and the histological grade of a solid astrocytoma; the higher the ratio, the higher the grade of the studied astrocytoma (1).

Kuznetsov et al. reported that they noticed that in all of their patients with the diagnosis of glioblastoma multiforme, lipid groups were consistently detected (4). This finding is different from our results based on a large prospective clinical study, as well as the results of two other previous investigational groups (2, 3, 5). In our series, lipid groups were detected in only 29% of anaplastic astrocytomas and in 60% of glioblastomas (2). We believe that lipids might represent a marker of malignancy, because in the same series, lipids were detected in


DOI: 10.1227/01-NEU.0000129102.82344.80
none of the low-grade astrocytomas, pilocytic astrocytomas, and benign tumors such as meningiomas and pituitary adenomas (2); however, we are still far from stating that lipids are detected exclusively in glioblastoma multiforme. On the basis of the current experience, the presence of lipids could confirm malignancy, but their absence cannot rule it out. Another interesting finding in our series was related to the fact that gliomas with no detectable lipids were more vascular and tended to be more hemorrhagic during resection (2). It would be interesting to hear the thoughts of the Montreal Neurological Institute and Hospital group on this issue. We agree with the authors that this interesting observation needs to be investigated further in the future; the lipid concentration of a glioma might provide significant information regarding the behavior of this group of primary intracranial tumors.

The authors reported that the presence of lactate and the calculated lactate/creatine metabolite ratio did not correlate with the patient’s survival (4). They implied that the increased concentration of lactate might represent a highly aggressive glioma using nonaerobic metabolic pathways. This thought seems to be biochemically reasonable, but what would the case be in highly malignant, very aggressive tumor with significant amounts of neovascularization? Could this pathophysiological mechanism potentially alter the concentration of the measured lactate? It is apparent from this excellent retrospective study and other clinical series that a large multi-institutional, prospective clinical study is mandatory for the evaluation of the 1H MRS in the preoperative evaluation of solid, supratentorial tumors.

Kostas N. Fountas
Ioannis Karampelas
Macon, Georgia


In Reply:

We agree that there are limitations to the information content of individual MRS resonance intensities or resonance intensity ratios, which is why we developed the approach described, which uses the information available in the pattern of changes across multiple features (1). When relying on “pattern recognition,” it is not important whether one uses ratios or absolute quantification, provided that the pattern is discriminatory.

Absolute quantification might or might not be more discriminatory. It would certainly be more difficult. With the usual sequences used for spectroscopic imaging, absolute quantification would be confounded by heterogeneous relaxation time changes in tumoral tissue that would not be feasible to measure in individual patients.

Our experience with detection of lipids and lactate in brain tumors is based on spectra obtained at a TE of 272 ms using 90-180-180-degree pulses for volume selection (3). Such spectra show a resonance attributed to lipids, which have a short T2 relaxation time, only in the presence of large concentrations of mobile lipids. In our experience, this sequence is more reliable for detection of lactate than stimulated echo sequences, in which quantum coherences can interfere with detection of the lactate signal. In such T2-weighted spectra, detection of mobile lipids is an indication of malignancy, because the lipids reflect necrosis, which is a hallmark of glioblastoma (4). The pathological significance of lactate is less clear. Lactate may be elevated because it accumulates with tissue infarction as tumors outgrow their blood supply. Lactate also may be elevated because of aerobic hyperglycolysis that is not associated with ischemia (2).

Douglas L. Arnold
Montreal, Quebec, Canada

An Easy-to-use Intraoperative Digital Videography, Still Photography, and X-ray-capture System

To the Editor:

We read with interest the recent article by Ogilvy et al. (1). The authors describe a digital videography and still photography system obtained with Macintosh software and hardware connected either to an operative microscope or to any other device with S-video output. The authors describe this system to be of low expense, easy to use, and useful for storing digital data. According to the authors, the total price of the described system is approximately $10,000.