Neurosurgical forum
Letters to the editor

Precise Terminology in Scientific Communications

To The Editor: The editorial comment in the July, 1992, Neurosurgical Forum by Dr. Sundt (Sundt TM Jr. Precise terminology in scientific communications. J Neurosurg 77:159, July, 1992 (Letter)) is very much appreciated by continued readers. In addition to his plea for maintaining scientific terminology in published papers, I would like to stress the need for authors of articles to do more research of background material and to provide references to what has been reported in the past relative to the current subject.

In the same July, 1992, issue of the Journal of Neurosurgery, two articles concerning endovascular treatment of large cerebral aneurysms1,2 did not provide reference to landmark papers such as the use of horsehairs by Dandy or the innovative way of attracting iron filings into an aneurysm by use of a magnet. Both papers were interesting but we cannot re-invent the wheel of neurosurgery without demonstrating that a new technique is better than what has been accomplished in the past. This is particularly true when long-term results are not provided.

The obvious failure to research the full scientific literature relates to the interval limitations of the easy access to bibliographic references. Papers published prior to the 1960's are not available on the computer reference file. Leaning on the local medical librarian does not fulfill the obligation of the author of a scientific paper.

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References

Microsurgery and Radiosurgery in Small AVM’s

To The Editor: We appreciate the unique opportunity to have editorial comments to our manuscript by Professor Ladislau Steiner (who has been a distinguished and recognized expert in the field of radiosurgery for over 20 years) and his colleagues (Steiner L, Lindquist C, Cail W, et al: Microsurgery and radiosurgery in brain arteriovenous malformations. J Neurosurg 79:647-652, November, 1993 (Editorial)). Their editorial, only 300 words shorter than our own peer-reviewed article, appears to contain new data.

First, we wish to clarify three of Steiner’s misconceptions:

1. Our primary aim was not to compare microsurgery and radiosurgery but to present our microsurgical results in the treatment of small arteriovenous malformations (AVM’s) which might otherwise have been considered optimal for radiosurgery because of size and location. In a discussion of our surgical results, we felt it was necessary to discuss contemporary published radiosurgery results for similar sized AVM’s.

2. Even though Steiner creates the impression that his “center” was the only institute in the world where, for many years, cases could be referred for radiosurgery, others such as Kjellberg and associates1 might find this claim difficult to accept. Thus, in reviewing indications, results, and referral patterns, we were compelled to consider radiosurgery data from other centers.

3. The rationale for Steiner’s advocacy of laser guidance in stereotactic craniotomy as preferable to a probe, because it is more “elegant andatraumatic,” escapes us. The size of the bone flap bears no relation to the usefulness of the various stereotactic localizers. Furthermore, the probe we use is placed to the depth of the lesion when the dura is opened before any measures are taken to relax or dissect the brain.6 To the contrary, the laser not being “locked on” to the lesion and not measuring depth would put the surgeon at great disadvantage to carefully dissect, retract, and approach the lesion. Following microsurgical principles of accuracy and atraumatic exposure, we recommend that laser guidance not be used.

Second, we wish to comment on the “facts” that Steiner, et al., provide for ‘calm consideration.”

Fact 1: The Latency Period. Steiner, et al., state that the onset of total obliteration is “1 or 2 years or more” following treatment and conclude that “the real time of obliteration . . . could not be established.” Without some statistical endpoint, how can we then analyze the cure rate of radiosurgery? It seems to us that, after more than 20 years of gamma knife therapy which encompasses almost 2000 cases and presumably careful follow-up evaluation, a more secure statement regarding its effectiveness could be offered. We selected a time period of 2 years as most appropriate in view of

* Italicized quotations are from the editorial of Steiner, et al.
the available published data for the radiosurgical treatment of small AVM’s.

Fact 2: AVM Volume and Dose. Steiner’s statements indicate that AVM’s greater than 3 cm are being treated. “In large AVM’s treated with similar doses, comparable obliteration rates can be achieved, but at the price of higher risk.” The facts escape us — does this mean that large AVM’s have an obliteration rate of over 80% or does it mean that the risk of treating large AVM’s is prohibitive? Our information from published data indicates that the best rate of radiosurgical obliteration and the least complications are inverse to the size of the AVM, regardless of the radiosurgical method employed.

Fact 3: Partial Obliteration of an AVM and Subsequent Course. We were reassured reading their initial comments that Steiner, et al., agree with the majority of neurosurgeons that patients remain at risk for hemorrhage as long as the malformation is present. However, on reading further of their life-table and statistical analysis, we were chagrined to read that their interpretation of events has changed to indicate “a sustained decrease in the risk of hemorrhage late in the follow-up period” of partially obliterated AVM’s.

We are unaware of any publication relevant to the long-term protection against hemorrhage provided by partial obliteration of an AVM. The fact is that we still subscribe to the recommendation that a partially obliterated AVM is just as dangerous as the original — perhaps more so.

Fact 4: Location of AVM. We did report small AVM’s in deep locations which were operable and also indicated that certain deep AVM’s were surgically inaccessible and thereby ideal candidates for radiosurgery, notwithstanding the late complications from radiosurgery. We have utilized a linear accelerator-based radiosurgery system at our institution since 1989 for treatment of the uncommon AVM’s that are small and surgically inaccessible.

Fact 5: Radiosurgery and Aneurysms. Steiner’s statement that he has obliterated aneurysms not associated with AVM’s was a most astonishing report and we question the information on which this was based. Perhaps other radiosurgery centers are performing or will perform similar procedures. Even the concept that radiation could obliterate an aneurysm with little substance in its wall without injuring the larger parent artery must be based on pathological anatomy to which we are not privy. We look forward to more reports on the radiosurgical treatment of cerebral aneurysms. However, given the devastating natural history of cerebral aneurysms, we prefer operative clipping.

Fact 6: Clinical Outcome. Steiner, et al., inquired of our series: “Could it be that surgery arrested the ongoing restoration process?” Their figures provided for the gamma knife suggest that the radiation was a tonic abetting neurological improvement: “The motor deficit completely resolved in 54% of cases” after treatment.

This apparent discrepancy may be explained by earlier institution of radiosurgery than microsurgery. As we point out in our article, the timing of surgery was based on our assumption that the patient had reached a plateau of improvement and to the best of our knowledge would gain little or no additional function from the time we contemplated surgery. In other words, the deficit was fixed. Perhaps as Steiner, et al., suggest, if the patient was treated with the gamma knife instead of microsurgery, there could have been further neurological improvement. We doubt it, since logic would hold that a treatment that is so destructive could not be equally reparative.

Fact 7: Clinical Outcome/Adverse Effects. Our review of published results of gamma knife therapy, presumably based on 20 years of experience, indicates an 80% obliteration rate for small AVM’s. This fact, in the few years between its publication and the current editorial by Steiner and colleagues, has changed so that the good results now approach 92% (87% total obliteration, additional 5% subtotal obliteration with no rebleed) which they attribute to “learning curve effects” (presumably very steep), related to equipment, planning, and brain protection that virtually guarantees a good result. This is a most remarkable phenomenon about which we can only comment in anecdotal fashion: Recently, we successfully resected a 3-cm right temporal AVM in a 30-year-old man whom Dr. Steiner had treated 3½ years previously with the gamma knife. The pretreatment angiogram was exactly as our recent preoperative angiogram, on which we could find no change in the AVM following gamma knife therapy. At surgery, there was no gross or histological evidence of radiation effect to the AVM or surrounding brain. This may be a very rare outcome under the current ultra- sophistication of gamma knife therapy, but it makes us unsure of what to believe.

In the editorial, Steiner, et al., minimize the adverse short- and long-term effects of gamma knife treatment and suggest that steroids will alleviate most problems. Unfortunately, the patient we cited in our article continues to deteriorate both clinically and radiographically in spite of using medications to counteract vasogenic edema. Although we have not seen it, we understand that some patients recover completely from adverse radiation effects.

Since our manuscript was submitted, a paper on the treatment of venous malformations of the brain by gamma knife has been published by Steiner and colleagues. In an upcoming Letter to the Editor, we comment on this paper and the unusually high incidence of radiation damage in that series as compared to the treatment of AVM’s, which Steiner, et al., now report as “only 3%.” In the article on venous malformations, the radiation complication rate in the series was 30% and the rebleed rate was also 30% with one death. This major inconsistency was not explained by dose (same), size of lesions (small), or other parameters of treatment. The reader was left to draw the conclusion that the complications of radiation damage with the gamma knife are related only to the pathological entity treated, presumably different from AVM’s, venous malformations, cavernous malformations, and possibly aneurysms. These remarkable assumptions will require