Subarachnoid hemorrhage


Ruptured aneurysm–related subarachnoid hemorrhage (SAH) is an emergent neurosurgical condition requiring clipping or embolization of the aneurysm. Moreover, SAH-induced vasospasm often leads to cerebral infarction and morbidity, or death. Kuo et al. conducted a laboratory investigation to evaluate the effect of baicalein reduction of neurological injury in the early stage after SAH. They found that baicalein significantly decreased mortality and neuronal injury. Moreover, treatment with baicalein was associated with a decrease in reactive oxygen species (ROS) and better neurological scores.

Their study provided an important potential application of baicalein in the improvement of SAH-induced neuronal injury and cerebral vasospasm, and aroused the curiosity of readers to ask whether the effect of baicalein is through direct passage through the blood–brain barrier to regulate the cerebral inflammation and ROS, or indirectly regulates the peripheral blood inflammation to improve the outcome of SAH-induced vasospasm.

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Disclosure
The authors report no conflict of interest.

Reference

Radiographic resolution

To The Editor: We found the report by Takagi et al.4 in the Journal of Neurosurgery of considerable interest (Takagi I, Shakur SF, Lukas RV, et al: Spontaneous radiographic resolution and subsequent redemonstration of an untreated glioblastoma. Case report. J Neurosurg 115:24–29, July 2011). In this paper the authors offered two explanations for why this patient’s untreated glioblastoma no longer enhanced on MRI. We believe that there is a third explanation that was not fully explored but warrants our attention whenever using MRI for tumor follow-up. While

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the authors did not describe the details of imaging in their report, we have reasons to suspect that the second study, in which the tumor did not appear to enhance, was performed on a 3-T scanner using a gradient echo T1-weighted technique.

There are a number of factors that contribute to the magnitude of tumor enhancement on MRI. These include time elapsed from injection, the contrast agent selected and its dose, the specific scan technique, and field strength. It has long been an accepted fact that gradient echo T1-weighted techniques offer less sensitivity to gadolinium contrast compared to spin echo T1 imaging techniques.1 Nevertheless, it is not uncommon to see gradient echo T1-weighted techniques used on 3-T scanners for both pre- and postcontrast imaging. This technique is commonly used at 3 T both to circumvent the inherently lower T1 tissue contrast encountered at high field strength and to limit power deposition, since this may be an issue at high field strengths. The known limitations of the gradient echo technique for postcontrast imaging seems to be tacitly accepted for 3 T, however, perhaps with the hope that 3-T scanners may be inherently more sensitive to gadolinium. The latter is widely accepted but without substantial experimental proof at concentrations comparable to those encountered in brain tumors.

We think it is important to consider the possibility that the apparent lack of enhancement described in this report could be an artifact of technique. While just conjecture on our part, since the scan details were not included, that explanation seems much more likely and better fits the principle of Occam’s razor than the concept of spontaneous regression of a glioblastoma. While much to be desired, that theory runs counter to decades of imaging experience with this tumor. The famous physician-writer Dr. Arthur Conan Doyle had his character Sherlock Holmes use this reasoning in such circumstances, “Once you eliminate the impossible, whatever remains, no matter how improbable, must be the truth.” In this particular case the possibility of an MR artifact certainly seems in the realm of the possible. We also have experimental evidence that indicates that diminished contrast sensitivity should be expected on 3D gradient echo imaging at 3 T,2 and this limitation of 3-T MR has also been described in at least one previous report.3 Our interest in this pitfall was stimulated by our own experience with a case of metastatic disease to the brain that demonstrated resolution of enhancement in a fashion remarkably similar to that noted in this brain that demonstrated resolution of enhancement in a own experience with a case of metastatic disease to the own experience with a case of metastatic disease to the own experience with a case of metastatic disease to the own experience with a case of metastatic disease to the own experience with a case of metastatic disease to the

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Whether or not field strength and scan technique alone explain the findings in this particular case, we believe it is important for radiologists and neurosurgeons alike to consider carefully the effect of technique and field strength on postcontrast MRI. Standardizing and optimizing the factors that contribute to apparent contrast—field strength, agent, dose, time from injection, and scan technique—will minimize the effects of technique on the postcontrast tumor enhancement qualities.

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Fig. 1: A: Axial T1-weighted image obtained at an outside site using spin echo technique (TR 600 msec, TE 17 msec) with chemical fat suppression. It well demonstrates a faintly apparently enhancing periventricular lesion (arrow). B: The patient was referred to our hospital for diagnosis and treatment of this lesion and a second scan was obtained using a 3-T MR scanner and an MP-RAGE (magnetization-prepared rapid gradient echo) technique (TR 1760 msec, TE 3.1 msec). On that scan the lesion no longer shows enhancement as seen here on the corresponding axial slice. No steroids or other medications had been administered to explain this change in appearance, and regression of a non-neoplastic process was a consideration. C: Two months later a third scan was obtained, this time on a 1.5-T MR unit with a spin echo technique (TR 600 msec, TE 20 msec). On this axial section obtained at the same level as the images in A and B, the lesion once again enhances and has also enlarged compared with the first scan. At this point the lesion was biopsied and proved to be a brain metastasis from a lung primary.

Disclosure

The authors report no conflict of interest.

References

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