Anesthesiology
1999; 90:320

In Reply:—We are grateful for Dr. Prall's interest in our case report[1] and appreciate the opportunity to respond to his comments.

In his letter, Dr. Prall states "the flexible catheter tip extends only 0.5 mm beyond the rigid cranial bolt, when applied according to the manufacturer's guidelines." However, there is a 10- to 20-fold discrepancy between the manufacturer's (Camino Laboratories) and Dr. Prall's claims. Specifically, placement of the fiberoptic intracranial pressure (ICP) monitor—according to the insertion method suggested by the manufacturer—should result in the catheter tip being 0.5 to 1.0 cm (not 0.5 mm, as cited by Dr. Prall) beyond the end of the rigid bolt. Nonetheless, as alluded to by Dr. Prall, the risk of catheter movement in a magnetic field should diminish as the length of catheter protruding into the brain decreases.

Of greater concern, the package insert clearly indicates that the ICP monitor may be inserted deeper into the brain at the discretion of the surgeon. Specifically, the package insert states, "The surgeon may easily vary the insertion depth by locating his fingers at the proper cm mark . . . For example, placing the fingers at 5.5 cm will locate the tip of the catheter 1 cm beyond the end of the bolt, into the parenchyma" (OLM Intracranial Pressure Monitoring Kit, Camino, Model 110-4B). In this manner, it is possible to insert the catheter tip up to 4 cm (beyond the bolt) into the parenchyma of the brain. At this depth, it may be possible for the ferromagnetic catheter tip to move and cause parenchymal injury when exposed to strong magnetic fields (*e.g.*, 1.5 Tesla, as cited in our case report). In fact, we are installing a magnetic resonance (MR) imager with a field strength of 3.0 Tesla. Therefore, in the setting of the new scanner, we anticipate that the results of our laboratory investigation would substantially *underestimate* the likelihood of patient injury during MR imaging.

Regarding the potential for thermal injury, our point is as follows: the antenna-like effect of ferromagnetic and nonferromagnetic metals (*e.g.*, aluminum or copper) is most likely to occur when loops with a circumference of approximately one quarter the radiofrequency wavelength are formed. This set of circumstances creates an environment in which radiofrequency energy may be absorbed by the metallic biomedical device, which, in turn, may result in heating of the device and injury to adjacent tissues. The length of the ICP catheter was 64 cm, which met the one-quarter wavelength criteria. However, it deserves mention that this measurement was the total length (*i.e.*, intracranial plus extracranial segments). The fact of the matter is neither the intracranial nor the extracranial segment of this fiberoptic monitoring catheter is long enough to result in loops fulfilling this criteria. Therefore, we are not surprised by Dr. Prall's observations in his unpublished data.

Lastly, the manufacturer is under no obligation to prove the safety of their ICP monitor when exposed to MR imaging. Dr. Prall cites clinical experience and unpublished data, demonstrating the lack of morbidity associated with the use of this catheter during MR imaging at his institution. However, the scientific literature is devoid of this information.

Robert E. Grady, M.D.
C. Thomas Wass, M.D.
Department of Anesthesiology
Mayo Clinic
Rochester, Minnesota
wass.thomas@mayo.edu

Reference

1. Grady RE, Wass CT, Maus TP, Felmlee JP: Fiberoptic intracranial pressure monitoring during magnetic resonance imaging. ANESTHESIOLOGY 1997; 87:1001-2

(Accepted for publication May 11, 1998.)

Anesthesiology
1999; 90:320-1

Studies' Divergent Results

To the Editor:—The article by Ebert *et al.*[1] describing an absence of renal injury in volunteers anesthetized with 1.25 minimum alveolar concentration sevoflurane for 8 h raises several issues. First, in a recent letter[2] a colleague of Dr. Ebert's questions the clinical relevance of a study by Eger *et al.*[3] nearly identical to this study and further comments that "it is alarming that Eger *et al.*[3] would design and conduct a research protocol that maximized the likelihood that sevoflurane administration would result in human renal injury and that this protocol received approval from the human research review committee." Are we to infer that the concern expressed in the cited letter no longer exists, and, if not, what in fact were the volunteers and the human research committee evaluating the merits of this study[1] told about the real possibility of renal damage?

Second, the results of this apparently well-done study are substantially different than those of the previous and apparently equally well-done study.[3] More specifically, Eger *et al.*[3] found evidence of worrisome, albeit transient, renal function changes in volunteers breathing 1.25 minimum alveolar concentration sevoflurane for 8 h, whereas Ebert *et al.*[1] found little or no renal impairment in volunteers after the same exposure to sevoflurane. It may be that this difference