of who injected the diatrizoate into the shunt intraoperatively. Was it the anesthesiologist, the surgeon, the radiologist, or someone else? This question is not asked to assign fault but rather to identify the most appropriate procedures for preventing future mishaps. With our case, the diatrizoate was injected by a radiologist who was unaware of the probable neurotoxic complications.

The authors mention that a radiologist performed a preoperative computed axial tomography scan and visualized the shunt with iohexol (Omnipaque), a nonionic, low-osmolality contrast agent, an appropriate choice for this intrathecal injection. This aspect of the case emphasizes their inappropriate use of diatrizoate intraoperatively and supports their recommendation for the "establishment of a protocol for the use of radiographic contrast agents in the operating rooms." However, even the most detailed protocol must be accompanied by increased awareness about the neurotoxicity of all contrast agents and, particularly, the neurotoxicity of the ionic contrast agents.

Anesthesiologists are trained to be cautious when contemplating the injection into an artery of a drug that otherwise would be well tolerated when injected into a vein. Anesthesiologists also should be wary when injecting any substance through a catheter that violates the blood-brain barrier, depositing the substance intrathecally. Should an anesthesiologist, a surgeon, or a radiologist inject radiographic contrast media?—only if the anesthesiologist, surgeon, or radiologist is familiar with the compound and its consequences.

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Neurotoxicity of Contrast Agents: II

To the Editor:—Karl *et al.* are to be congratulated on the prompt recognition and treatment of the reaction to the subarachnoid injection of the radiologic contrast agent diatrozoate meglumine (Hypaque) intraoperatively.[1] As the authors state, mortality from this drug injection is about 50%. The syndrome resulting from the subarachnoid injection of ionic (and sometimes nonionic) contrast agents often is referred to as the ascending, tonic/clinic seizure syndrome.[2] As also stated, but not documented in this case, rhabdomyolysis, fever, and DIC may complicate the reaction. Some years ago, a patient was referred to our malignant hyperthermia biopsy center because he experienced a similar reaction, and the question of malignant hyperthermia was raised. As Ong and I reported, the patient was not found to be malignant hyperthermia-susceptible.[3]

Other cases of this reaction have been reported directly to the drug manufacturer.* It seems that the common denominator in such cases is the migration of the dye into the cerebral ventricles.

Supportive treatment is most effective because the syndrome appears to be self-limited, although this is as yet a conjecture.[4] On occasion, dantrolene has been used to treat the hypertonicity and fever. It is not clear whether the response to dantrolene is specific, because other therapy often is administered concomitantly.

This is another example of a rare reaction to a drug that is sometimes administered during surgery or for which the anesthesiologist is consulted and that may be fatal if not promptly recognized. Reporting of such cases in the medical literature and to the Food and Drug Administration is to be encouraged.

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