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Safety of Pediatric Neuroimaging

William S. Ball, Jr

Often we must remind clinicians, and even ourselves, of the active role radiologists must play in monitoring the bioeffects of imaging modalities. Radiologists who perform pediatric imaging studies are aware of the responsibilities we have toward children while they are in our care. A number of reports by radiologists (1-3) have outlined steps required to perform sedation in the pediatric population safely and effectively. Radiologists have had an important role in protecting our children from unnecessary exposure to ionizing radiation, radioisotopes, ultrasound, magnetic resonance (MR), contrast media of all types, and therapeutic radiation by curtailing their overuse. As new frontiers develop in imaging, so will new frontiers develop in our responsibilities in patient care.

In this issue of *AJNR*, the report by Philbin et al (4) on the changes in vital signs that term neonates may have when undergoing MR imaging is a brief reminder of the responsibilities we all share. Their report documents fluctuations in heart rate, blood pressure, and oxygen saturation in one group of neonates who underwent MR imaging. Appropriately, this group was compared with a control group that had similar sedation and physical conditions but did not undergo MR, and failed to demonstrate similar physiologic fluctuations. However, it should be added that by current observation, none in the patient group appeared to suffer any significant harmful effect as a result of this experience. We are left with little indication of the justification of and need for MR imaging in the patient group, to help us form an opinion of risk versus benefit. This issue certainly requires further observation and study.

The sensitivity of the stable and unstable preterm as well as term neonate to outside stimuli is well known. Detecting the harmful effects of these is difficult, but the tendency and potential

for physiologic fluctuations such as witnessed by the authors generally increases with decreasing gestational age. These fluctuations are certainly real, but whether they are actually harmful remains to be established. There is more than substantial justification to explore the potential benefit of MR imaging in the evaluation of brain injury in both the preterm and the term infant. The potential of more advanced MR applications such as perfusion imaging, diffusion imaging, and MR spectroscopy to further our understanding of anoxic and ischemic injury to the developing brain is substantial.

The question is not whether we should proceed with such research, but how we are to proceed safely. This is the responsibility of all who use current and future technologies in imaging. The primary question still is risk versus benefit. This is an issue that we as radiologists face daily, whenever we order an examination of a neonate, child, or adult. Studies of safety must proceed as must studies of efficacy, but neither can proceed without some consideration of the other. Clinicians and radiologists have always agreed on one key point, perhaps from a slightly different perspective—that the welfare of the patient should always come first.

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