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EDITORIAL

Magnetic resonance imaging in children: Role of the anaesthesiologist

Magnetic resonance imaging has gained widespread popularity in medicine and is considered the most important revolution in diagnostic imaging during the past decades. Successful diagnostic MR imaging requires a patient to remain completely immobile for 20–45 min in a noisy environment within the constraints of a small tunnel. The majority of children between the age of 1 and 7 years will require some form of pharmacological 'immobilization' to successfully complete such an examination.

Since the early clinical application of MR imaging, anaesthesiologists have been involved in the care of these patients and have reported individual solutions to particular problems encountered in an MR imaging suite [1–3]. The presence of a powerful magnetic field and the emission of radiofrequency waves may cause standard anaesthesia and monitoring equipment to malfunction, which may cause severe injury to the patient, and degrade MRI image quality [4]. In addition, during MR imaging examinations, patients are at a distance inside the magnetic bore, which complicates access to the airway [5].

Not surprisingly, case reports of mishaps during anaesthesia for MR imaging have accumulated over the past few years. They emphasize that a thorough understanding of the problems created by the magnetic field and full awareness of the specific risks are mandatory for optimal anaesthetic management. An effective solution to this problem, in our opinion, is to assign responsibility to one or at least a limited number of anaesthesiologists within the department. Rather than allowing anaesthesiologists who lack the appropriate experience to operate occasionally in the MR imaging rooms, the appointed staff member(s) should design the anaesthesia protocol, develop a resuscitation drill, decide on the monitoring equipment to be installed and supervise all anaesthesia-related tasks.

With regard to the issue of responsibility, the problem becomes important at the interdepartmental level. In fact, only a small percentage of paediatric patients receive general anaesthesia for MR imaging. The vast majority of children are treated with some form of sedation by members of the radiology or paediatric departments. Criteria used to refer patients to either sedation (by non-anaesthesiologists) or general anaesthesia are often arbitrary and anaesthesiologists are not involved in this decision. Often, only children who are considered high risk and those for whom previous attempts at sedation were unsuccessful (10–15% of sedations), are referred to the anaesthesia department. This practice of selective limited referral partially results from the ubiquitous shortage of anaesthesiologists outside the operating room. In addition, the extra cost involved with professional anaesthesia care are a major concern. Finally, it has previously been emphasized that general anaesthesia for MR imaging imposes serious risks to the patients and its use should be kept to an absolute minimum. But is the risk of anaesthesia care provided by a well-trained anaesthesiologist indeed greater than the risk of sedation provided by non-anaesthesiologists?

Conscious sedation techniques, which were considered safe and satisfactory for brief diagnostic procedures such as CT scanning, appear ineffective for MR imaging because of the higher intensity of noise and the longer imaging times. As a consequence, progressively larger doses of sedatives are experimented with and more potent hypnotic and analgesic drugs such as nembutal [6], methohexital [7], propofol [8], phenothiazines [9], midazolam [10], morphine, high-dose chloral hydrate[11], and various 'cocktails' [12,13], are administered by non-anaesthesiologists. This tendency has not gone unnoticed by at least some radiologists who feel uncomfortable with the idea that 'suddenly, with little or no training, radiologists (but also paediatricians and nurses) are functioning as an anaesthesiologist' [14]. How do we, as professional anaesthesiologists, feel about this recent phenomenon?

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According to Holzman and colleagues, it is the primary task of an anaesthesia department to provide institutional guidelines governing the safe care of patients during sedation and analgesia by non-anaesthesiologists [15]. However, the limitations of this strategy should be realized: even within a medical specialty, the dissemination of guidelines is unlikely to alter inappropriate practices [16]. Guidelines written out for other specialties undoubtedly will raise concern about responsibility whenever mishaps do occur. The American Academy of Pediatrics published nationwide guidelines on the elective use of depressant agents in children in so-called 'non-traditional settings' [17]. These recommendations virtually encompass the complete practice of what is referred to in our specialty as monitored anaesthesia care [18]. It is clearly stated that the state and risks of deep sedation may be indistinguishable from those of general anaesthesia and that the practitioner responsible for the patient and for the administration of sedative drugs must be competent to use such techniques [17]. But what does competence mean and how can it be achieved? In most European countries a complete training in anaesthesia takes 5 years and includes theoretical knowledge in basic physiology and pharmacology as well as the acquisition of technical skills such as endotracheal intubation, difficult intravenous cannulation, etc. The clinical training programme has to encompass not only induction and maintenance of anaesthesia but, most importantly, the management of life-threatening complications.

It is well known from clinical perception and from studies published in the anaesthesia literature that children are at greater risk from anaesthesia than adults.There is also evidence that fewer complications occur in the hands of experienced anaesthetists [19]. At the author's institute, 1st and 2nd year residents in anaesthesia are not allowed to perform anaesthesia or deep sedation in children without supervision. Another important issue was brought up in a survey of 86 deaths associated with the use of midazolam reported to the Department of Health Human Services: in only three deaths was an anaesthesiologist in attendance [20].

It is the author's opinion that anaesthesia lectures for non-anaesthesiologists may improve their understanding of what professional anaesthesia care means and of the various aspects involved in the safe administration of sedatives, hypnotics and analgesic drugs. However, it is not possible to teach someone how to perform anaesthesia safely and independently outside the operating room by lectures, not to mention by simply providing guidelines.

Anaesthetic techniques for diagnostic procedures have to be especially safe as, in some cases, they have no direct therapeutic implication. The performance of anaesthesia or deep sedation in children undergoing MR imaging requires considerable skills that can only be obtained through a complete professional training in anaesthesia. Rather than generating guidelines, we are convinced that anaesthetic departments have to use all their resources to provide the best possible care for these patients.

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