Title: Pediatric Mortality Related to Anesthesia Outside of the Operating Room

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ABSTRACT BODY: INTRODUCTION: During the last two decades the anesthesia for procedures done outside operating rooms became more and more commonly requested. Anesthesiologists had to face increasing challenges of remote location, scarce resources and sicker and sicker patient population. We would like to share several cases that happened in our hospital in MRI suite over the last 9 years.

RESULTS: A total of 38140 anesthetics have been administered to pediatric patients in our institution between February 1998 and November 2006, of which 6286 (16%) were administered outside the operating room. Characteristics of these patients are shown in table 1. Three deaths occurred resulting in a frequency of approximately 1:2100 anesthetics administered in this setting. Patient characteristics of these three deaths are shown in table 2. It has been suggested M&M outside the OR may be greater than M&M in the OR.[1-4] We compared perioperative/periprocedural mortality in operating rooms settings and outside operating rooms in our institutions pediatric patients during the same time period and found a mortality rate inside operating rooms of 4:32329 or 1:8082. As such there is almost 4-times increased mortality associated with anesthesia in outside vs. inside operating rooms procedure at our institution. This finding suggests a higher risk of providing anesthesia in outside operating room settings. Of note, all mortalities underwent an internal peer review model at our institution as described previously.[5]

DISCUSSION: The perils of performing anesthesia in MRI settings are well known and have been described extensively.[3,4] Adverse sedation effects occur regardless of the sedatives used or the route of administration.[4] In our institution we utilize the MRI-compatible monitors (Invivo Inc., Lahan New York), MRI-compatible anesthesia machine (Aesthiva/5, Datex-Ohmeda, Madison, WI), and non-ferromagnetic laryngoscopes and blades (MINRAD, Inc. Orchard Park, New York) as well as MRI compatible infusion pumps (MEDRAD, Inc. Indianola, PA). Our practice consists of inducing general anesthesia in these children after they are brought into the MRI suite using a standardized inhalation technique (although intravenous induction of general anesthesia is sometimes performed). Airway management depends on the specific patient, anesthesia provider and/or scanning requirements.

In summary, we believe that anesthesia in remote location, such as MRI possess inherited risks, that are significantly higher that anesthetic risks inside operating rooms. Patients who were considered too ill to undergo invasive surgery, but where it has considered “safe” for the patient to undergo noninvasive radiological procedure may need to be reevaluated. As a result, the indications for imaging studies must be imperative for further patient management and take into consideration the increased risk of performing anesthesia in outside operating rooms locations.

Table 1. Adverse events in MRI settings

Case	Age	Sex	ASA	Procedure	Patient medical history	MRI Event	Outcome
1.	4m	F	4	MRI chest	AOP, BPD, s/p PDA, Double aortic arch, encephalopathy, GERD, anemia	Bradycardic arrest	Demise in < 1hour
2.	5m	M	4	MRI chest	Anomalous venous return, pulmonary atresia, s/p BLTx2	Bradycardic arrest	Demise in < 8 hours
3.	22m	F	3	MRI brain	BPD, GERD, tracheomalacia, development delay,	Bradycardic arrest	Demise in < 1hour

					failure to thrive		
AOP – apnea of prematurity, BPD – bronchopulmonary dysplasia, PDA – patient ductus arteriosus, GERD – gastro esophageal reflux disease, BLT- Blalock-Taussig procedure							

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