How Not To Do Anesthesia: Decreasing Pediatric Exposure to Anesthesia for MRI

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Abstract

As research studies continue to accumulate associations between exposure to anesthesia and cognitive dysfunction/learning and behavioral diagnoses in children[1], anesthesiologists are motivated to minimize these exposures. Anesthesiologists provide many hours of anesthesia to pediatric patients for radiologic exams. Combined MRI studies can take up to 3 hours, and many patients come for repeated studies as frequent as every 3 months.

We teamed together with the Departments of Radiology and Child Life to provide a collaborative and successful approach to scheduling and obtaining radiology exams without anesthesia. We report our success for MRI exams.

- Expanded guidelines for schedulers to identify children that are good candidates to avoid anesthesia.
- Children uncertain or close to age cutoffs offered early non-anesthesia AM slots that were just prior to an anesthesia "add-on" slot as a backup plan.
- The child life department dedicated a child life specialist one day per week for MRI scans without anesthesia.
- A Children's Miracle Network grant provided the funds to purchase MRI compatible movie goggles.

In our case series, children 6 to 11 yo had an 80% success rate and children 0-5 yo had a 63% success rate for obtaining MRI exams without anesthesia. This was a significant improvement from prior years. Importantly, the child life specialist's involvement helped educate MRI technologists and families and change the culture of how MRI exams are obtained.

Background

The FDA MedWatch released in December 2017 warned that "Healthcare professionals should balance the benefits of appropriate anesthesia in young children and pregnant women against the potential risks, especially for procedures that may last longer than 3 hours or if multiple procedures are required in children under 3 years."[2] It is our responsibility as pediatric consultants to identify opportunities to decrease or avoid anesthesia in children.

Historically, as pediatric anesthesiologists, we encouraged families to attempt diagnostic scans without anesthesia but this was time consuming and had limited success.

This led to lost anesthesiology service time while on "standby" and lost revenue for radiology because there was no structure to these "attempts".

Lost revenue for an unused MRI scanner is approximated at $500 per hour.

Methods

CHILD LIFE SCREENING
(PEDATRIC ANESTHESIA SCHEDULING)

Please follow these guidelines for referring pediatric patients to child life specialists. Please use the following screening criteria for all pediatric anesthesia cases. Screening criteria is set for each modality.

- Has the patient attempted any exam without anesthesia?
- Are the parents interested in attempting without anesthesia?
- Does the patient meet the following criteria?

MRI	CT	NUC MED/ PET
6 years and older	**2 years and older**	**6 years and older**
No significant developmental delays	**Patient to arrive 60 mins before scheduled appt.**	**No significant developmental delays**

Please send E-mail to Carla Andalis at cjandalis@ucdavis.edu when a pediatric patient meets the criteria, or parents show significant interest. Please include the following information,

- MRN
- EXAM TYPE
- APPOINTMENT DATE/TIME if scheduled
- NOTES

Results

Pediatric MRI Volume
"Coached" vs General Anesthesia

Age 0-5 years	Year 2015	Year 2016	FY 2017	Percent Change Annualized
MR with General Anesthesia	661	677	353	(21.8%)
MR without GA (coached)	413	660	605	37.4%
Coached MR exam as percent of total (coached / total)x100	*38.5%*	*49.4%*	*63.2%*	*13.8%*

Age 6-11years	Year 2015	Year 2016	FY 2017	Percent Change Annualized
MR with General Anesthesia	305	253	114	(32.4%)
MR without GA (coached)	373	551	460	25.2%
Coached MR exam as percent of total (#coached / total)x100	*55.0%*	*68.5%*	*80.1%*	*11.6%*

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Conclusions

What started out as a struggle to balance a pediatric anesthesiologist's objective to minimize anesthesia exposure with lost anesthesiology service time and revenue, led to a highly successful team approach. In our case series, children 6 to 11yo had an 80% success rate and children 0-5 yo had a 63% success rate for obtaining MRI exams without anesthesia.

References

1 Jevtovic-Todorovic, Vesna. "Anesthetics and Cognitive Impairments in Developing Children."JAMA Pediatrics, 2 Oct. 2017, doi:10.1001/jamapediatrics.2017.3033.

2 "Safety Alerts for Human Medical Products - General Anesthetic and Sedation Drugs: Drug Safety Communication - New Warnings for Young Children and Pregnant Women." U S Food and Drug Administration Home Page, Office of the Commissioner, 14 Dec. 2016.