Prolonged Sedation and Delayed Recovery Associated with Hypotensive Events in Patients Receiving Dexmedetomidine for MRI

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Introduction: Dexmedetomidine is a preferred sedating agent for MRI despite risk of hypotension and bradycardia.[1-4] Limitations of previous studies include varying unidimensional definitions of hypotension and limited description of treatments provided.[1, 2, 4-6]

Aims: To describe the incidence of hypotension using a two-pronged, intervention-based definition in patients undergoing sedated MRI, and to compare the demographics, clinical characteristics, and recovery time of patients with and without hypotension.

Methods: Upon Institutional Review Board approval, medical record data were extracted for outpatients <18 years of age sedated with dexmedetomidine for MRI from 06/01/2009 to 06/30/2016. Hypotension was defined as a 20% reduction in systolic blood pressure from baseline lasting ≥10 minutes, coupled with a fluid bolus. Variables were: demographics, weight, height, diagnosis, sedatives, blood pressure variability, heart rate, intravenous fluids, sedation time, and recovery time. T-tests were used to compare study groups. Statistical significance was $p \leq 0.05$.

Results: Of 1590 patient encounters meeting inclusion criteria, 90 (6%) experienced hypotension. Males were more likely to have hypotension (8.01% versus 3.97%, $p=0.002$). Compared to patients without hypotension, patients with hypotension had greater systolic blood pressure variability overall (mean 10.49 vs. 8.02, $p<0.001$), and a longer sedation period (mean 2.41 hours vs. 3.11 hours, $p<0.001$). Among hypotensive patients, systolic variability was greater prior to the intervention (mean 9.66 vs. 6.26, $p<0.001$), and these patients took longer to recover than their counterparts (1.20 vs. 1.65 hours, $p<0.001$). There were no statistical differences between groups for propofol administration or additional dexmedetomidine boluses.

Discussion: Our lower incidence of hypotension is likely related to the two-pronged intervention-based definition; this approach may more accurately reflect clinically meaningful declines in blood pressure. Reductions in prolonged sedation could maximize patient safety. Research further examining prolonged sedation, provider intervention, and BP variability is required to identify targets for interventions.

References:

1. Ahmed, S. S., Unland, T., Slaven, J. E., & Nitu, M. E. (2015). High Dose Dexmedetomidine: Effective as a Sole Agent Sedation for Children Undergoing MRI. *International Journal of Pediatrics*, *2015*, 1–7 7p. http://doi.org/10.1155/2015/397372

2. Lubisch, N., Roskos, R., & Berkenbosch, J. W. (2009). Dexmedetomidine for Procedural Sedation in Children With Autism and Other Behavior Disorders. *Pediatric Neurology*, *41*(2), 88–94. http://doi.org/10.1016/j.pediatrneurol.2009.02.006

3. Mahmoud, M., & Mason, K. P. (2015). Dexmedetomidine: review, update, and future considerations of paediatric perioperative and periprocedural applications and limitations. *British Journal of Anaesthesia*, *115*(2), 171–182. http://doi.org/10.1093/bja/aev226

4. Mason, K. P., Turner, D. P., Houle, T. T., Fontaine, P. J., & Lerman, J. (2014). Hemodynamic Response to Fluid Management in Children Undergoing Dexmedetomidine Sedation for MRI. American Journal of Roentgenology, 202(6), W574–W579. http://doi.org/10.2214/AJR.13.11580

5. Phelps, J. R., Russell, A., Lupa, M. C., McNaull, P., Pittenger, S., Ricketts, K., … Bortsov, A. V. (2015). High-dose dexmedetomidine for noninvasive pediatric procedural sedation and discharge readiness. *Pediatric Anesthesia*, *25*(9), 877–882. http://doi.org/10.1111/pan.12569

6. Siddappa, R., Riggins, J., Kariyanna, S., Calkins, P., & Rotta, A. T. (2011). High-dose dexmedetomidine sedation for pediatric MRI. Paediatric Anaesthesia, 21(2), 153–158. http://doi.org/10.1111/j.1460-9592.2010.03502.x