Perioperative Anesthesia Protocol for Adults with Developmental Disabilities

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Background/Purpose

- In the United States, approximately 2.1 million adults are affected with a Developmental Disability (DD) which include diagnoses such as autism, cerebral palsy, and Down syndrome.
- Adults with DD and their support persons report traumatic experiences when transitioning their anesthesia care from pediatric to adult hospitals.
- Adults with DD undergoing surgical procedures have unique anesthetic considerations. To better serve this population, an anesthesia preoperative consult inclusive of a support person's input and the development of personalized perioperative management plans are needed.
- This project aims to develop an evidence-based protocol for anesthesia considerations for this population. The goals are to increase provider knowledge and confidence in caring for adults with DD with a future goal of reduced patient and caregiver traumatic experiences.
- This project was implemented within the anesthesia department at the University of Cincinnati Medical Center (UCMC). Collaboration with strategic partners, Cincinnati Children's Hospital Medical Center's anesthesia department and the Freeman Center for Developmental Disabilities, aided the protocol development. Collaboration with UCMC's inpatient pharmacy, marketing team, and perioperative nurses was also key for successful implementation.
- PICO: In anesthesia providers, does education on an evidence-based perioperative protocol compared to no protocol and no education increase provider knowledge with rendering care to adults with DD?

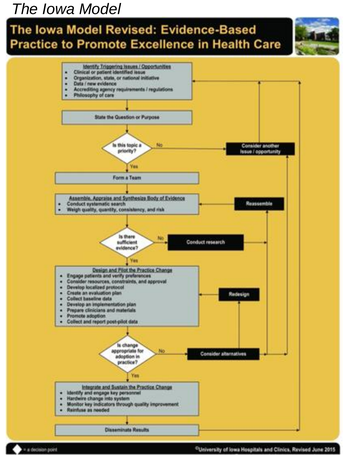
Available Knowledge

A literature review identified eleven supporting sources providing John Hopkins level 3-5 evidence: five sources supported the clinical problem and six sources supported the protocol's pharmacologic and nonpharmacologic interventions. Twenty additional sources supported the pharmacologic recommendations. CINAHL and PubMed were searched using the MeSH terms "adults with disabilities" AND "anesthesia" AND "autism" AND "surgery".

Model / Framework

Figure 1

The Iowa Model



- Patient issue identified via reported complaints
- Topic deemed a priority to reduce incidence of traumatic patient experience
- Interdisciplinary team formed
- Evidence to support clinical problem and interventions gathered
- Education created and presented to adult anesthesia providers. Provider knowledge assessed via pre- and post-test surveys
- Protocol and intervention items stocked in hospital perioperative areas
- Dissemination in process

The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care (University of Iowa Hospital and Clinics, n.d.)

Methods

- Perform literature review to support the clinical problem and establish evidence-based interventions for the DD perioperative protocol.
- Obtained university non-human subject IRB determination
- Collaborate with Cincinnati Children's Hospital pediatric anesthesia department, which had an established DD pediatric perioperative protocol, and the adult DD medical team to develop an adult anesthesia protocol.
- Create storyboard – a visual display describing the sequence of perioperative events to prepare the patient for the surgical/procedural experience. The text should be brief and the patient should see an adult with DD represented in the storyboard.
- Establish validity of assessment questions. Administer a pre-test to assess anesthesia providers' current knowledge of caring for adults with DD.
- Provide education via Grand Rounds presentation - 67 anesthesia providers were in attendance. The audience included CRNAs, SRNAs, anesthesiologists, residents, and anesthesiologist assistants.
- Administer post-test to assess knowledge gained and knowledge gaps.
- Analyze data using descriptive statistics.
- Provide education to perioperative nurses via a presentation at a staff meeting.
- Ensure access to interventions such as fidget toys, sensory precautions signs, storyboards, and medications.

Figure 2

Anesthesia Protocol for adults with DD: Pharmacologic Interventions

Drug	Anxiolysis Dose	Concentration	Onset	Half-Life	Considerations
PO Midazolam	0.25-0.5 mg/kg (max 20 mg)	5 mg/mL	15 min	2 hours	Can be given with cherry syrup/lemon-lime soda to distract from bitter taste Can give IV formula PO, or can order dose of PO Midazolam that will come as a syrup
PO Ketamine	4-10 mg/kg, average 6mg/kg (max dose 300 mg)	100 mg/mL	30 min	2 hours	Can be given with cherry syrup/lemon-lime soda to soda to distract from bitter taste Requires continuous supervision by anesthesia
PO Midazolam + PO Ketamine	0.5 mg/kg (max 20 mg) and 5 mg/kg (max 300 mg)	5 mg/mL (Midazolam) 100 mg/mL (Ketamine)	30 min	2 hours	Can be given with cherry syrup/lemon-lime soda to distract from bitter taste. Requires continuous supervision by anesthesia
IM Ketamine	3-7 mg/kg	100 mg/mL	5 min	2 hours	Consider addition of IM Glycopyrrolate (4 mcg/kg) to alleviate secretions or bronchospasm Requires continuous supervision by anesthesia
IM Ketamine + Midazolam	5 mg/kg + 0.05-0.15 mg/kg (max 10 mg)	100 mg/mL (Ketamine) 5 mg/mL (Midazolam)	5 min	2 hours	Consider lower range of Midazolam dosing if given in conjunction with IM Ketamine Requires continuous supervision by anesthesia
Intranasal Midazolam (off-label)	0.1-0.2 mg/kg (max 10 mg)	5 mg/mL	3-5 min	2 hours	Administration via nasal atomizer. Can burn. Requires continuous supervision by anesthesia
Intranasal Dexmedetomidine	2-4 mcg/kg	100 mcg/mL	15 min	2 hours	Administration via nasal atomizer. Can burn. Requires continuous supervision by anesthesia
SL Dexmedetomidine (Igalmi)	120 mcg and 180 mcg Film	N/A	20-30 min	2-3 hours	Patient should not swallow, but allow for SL absorption. OK to give with hard candy or sucker to allow time for absorption. Requires continuous supervision by anesthesia
EMLA Cream	2.5g (1/2 of 5g tube) 2 x 2 inches of skin	2.5% Lidocaine and 2.5% Prilocaine	1 hour	1-2 hours	Risk for methemoglobinemia Cover with occlusive dressing/tegaderm to allow for subQ penetration

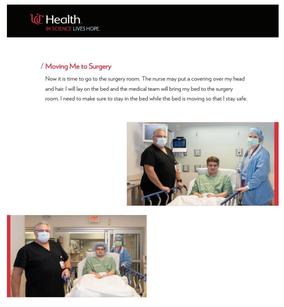
Figure 3

Anesthesia Protocol for adults with DD: Nonpharmacologic interventions

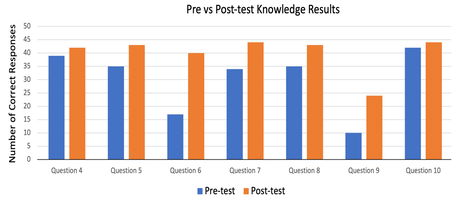
Non-Pharmacologic Interventions			
Early preoperative planning • Recommended for patient undergoing 1st anesthetic within UC Health system • Recommended if patient had significant changes to medical history, negative anesthetic experience, or > 2 years since last anesthetic	**Care Clustering** • Schedule multiple procedures and/or diagnostics to be completed during one hospital visit/anesthetic	**Champion Provider Team** • IDD team member may be requested via preoperative visit • Provides consistent anesthesia team equipped to care for patient	**Provider Education** • Education provided to adult anesthesia providers and perioperative staff • Protocol located on UC Anesthesia Website
Storyboards • Allows patient and family to review stepwise outline of perioperative care from entering the hospital through PACU stay • Made available via UC Health website	**Sensory Precautions** • Minimize number of providers in room • Avoid loud noises or sudden movements • Decrease exposure to bright lights • Consider tight binding/covers for comfort	**Distraction Techniques** • Fidget toys, spinners, tablets, noise-canceling headphones • Items located at Nurse's Station in Same Day Surgery	**Scheduled for 1st case** • Minimize NPO time

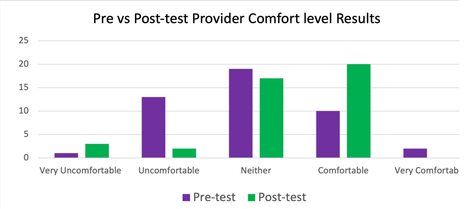
Figure 4

Storyboard Slides



Results / Outcomes





- N= 45 participants
- 2 demographics questions, 1 Likert-scale question of provider comfort level, 7 knowledge-based mulitple-choice questions
- Mean Pre-test Score: **72%.**
- Mean Post-test Score: **91%**
- Median Pre-test provider comfort level: **Neither comfortable or uncomfortable**
- Median Post-test provider comfort level: **Comfortable**

Discussion

- Identification of the appropriate time and process to obtain IV access in an uncooperative adult with DD had the highest increase in knowledge gained at 51.11% improvement (Question 6)
- Despite a 31.11% increase in knowledge, a persistent knowledge gap exists in the appropriate timing and dose of IM Ketamine (Question 9)
- Future scholarship should assess the patient experiences prior to and after protocol implementation
- Limitations include lack of collected survey data on patient and caregiver negative experiences at the implementation site, a deficit of randomized control trials supporting the protocol's interventions, and a small sample size of anesthesia providers who participated in the education and assessment surveys
- Only 45 of the 67 surveyed participants' data could be analyzed due to a lack of having both pre and post-tests for 22 anesthesia providers in attendance.

Conclusions

Adults with DD in Cincinnati, Ohio have reported traumatic experiences when transitioning their care from the pediatric to adult hospital. The current adult perioperative setting failed to accommodate this population's unique communication, sensory, and emotional needs. This project demonstrated that education of the pharmacologic and non-pharmacologic interventions increased anesthesia providers' knowledge and comfort levels when providing anesthesia care to adult patients with DD. Sustainability will be achieved with continued efforts to educate providers on this patient population as they transition their perioperative care from the pediatric to adult setting, as well as consistent care provided by team of DD Champion Providers.

References

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