Learning Objectives

After completing the activity, the provider can:
1. Review some sentinel cases of dental sedation with catastrophic outcomes.
2. Understand the various sedation practices of the dental community, with a specific consideration regarding the pediatric patient.
3. Describe the pediatric physiology that puts children at increased risk during sedation/anaesthesia.
4. Be able to describe Wisconsin laws and accreditation requirements regarding dental sedation.
5. Discuss the recommendations of the American Academy of Pediatrics, the American Society of Anesthesiologists, and the Society for Pediatric Anesthesia with regard to monitoring, recovery, and sedation practices when providing in-office and procedural sedation.
Caleb’s Story

Caleb’s Story: Playing with Fire

- 6 ½ y.o. Boy in CA
- Scheduled for Supernumerary tooth extraction btw incisors
- Oral Surgeon Anesthetic w/ 2 dental assistants
  - IV – fentanyl, midazolam, Propofol, & ketamine
  - Concurrent Dental Procedure
  - Noted apnea when pulse ox. – 69%
  - Failed intubation (knocked out teeth)
  - Failed cricothyrotomy
  - No CPR/ No oxygen 20 min

Pediatrics 141:4, April 2018

Another Child’s Death

- 4 y.o. Boy - significant ECC (Early Childhood Caries)
  - Behavioral problems
- Pediatric Dentist, license – Mod. Sedation
  - Dental Assistant – PALS certified
  - Midazolam X2, Nitrous Oxide
  - Recovery – Cynotic, Apnea, no pulse ox
  - CPR, 911, Dead on Arrival to hospital

Pediatrics 140:6, Dec. 2017
Culture & Society

Society & Culture

- ECC (Early Childhood Caries) - most common chronic childhood disease – Surgeon General
- 100,000 to 250,000 pediatric dental sedation or general anesthetics in the USA/year
- Presumed same safety profile - medical community

Parents don’t associate preventive dental care with health
- ECC disproportionately greater - low socioeconomic & special health care needs
- Parents don’t want their children to feel discomfort and increasingly request sedation and general anesthesia (Pediatr 2002 102(6):949-54.)
Special Populations

Pediatrics – Special Population

- Challenging Airway
  - Increased airway obstruction
  - Smaller airway
  - Respiratory arrest
- Increased HR & oxygen requirements
  - Quick to desaturate
  - Weight based dosages

Pediatrics – Special Population

- Younger Children - more likely to need sedation
- Behavioral/Developmental Challenges
- Longer procedures/ increased work
- Ped. Ps – sedation for anxiety, pain, immobility
"Of all patients receiving deep sedation/anesthesia for diagnostic and therapeutic procedures, the pediatric population is the subgroup at the highest risk level and with the lowest tolerance for error." – Cravero, et. Al.

Pediatric Anesthesiology 108:3, March 2009

Pediatric – Special Population

Special Population - Pediatrics

- Ped Sedation Research Consortium – even with skilled & motivated personnel – apnea, desaturations, laryngospasm & obstruction.
- Children younger than 6 (esp. < 6 month) at greatest risk of adverse event. [Anesth Analg 2009;108 (3):795-804.]
Incidence & Nature of Adverse Events During Pediatric Sedation/Anesthesia with Propofol Outside the Operating Room

- 49,836 Propofol anesthetics, 37 different sites, any service
- No deaths
- CPR X2
- Aspiration X4
- O₂ < 90 for > 30s – 154/10,000
- Central Apnea/Airway obstruction 575/10,000
- Stridor 50/10,000 & laryngospasm 96/10,000

Slippery Slope

- Terms “sedation” or “procedural sedation & analgesia” used when the patient would meet Joint Commission and Anesthesiologist’s definition of “Anesthesia”.
- “Children can easily slip from one level to a deeper level, and one would have to constantly be stimulating children to test their responsiveness to truly define their state.”

Dental Sedation
Dental Anesthesia History

- Dec. 11, 1844 – Extraction under N₂O (First Anesthetic)
- 1846 – Ether used successfully for Extraction
- 1940’s Lidocaine presented & used

Dentistry & Sedation

- General Anesthesia
  - Dentist, Dental Anesthetist, Anesthesiologist
  - Inhalational Anesthesia (N₂O Up to 75%)
  - IV anesthetic/ IM/ SQ (Parenteral)
  - Oral Sedation (Enteral)

Dental Specialties

- Oral Surgeons (Oral Maxillary Facial Surgeons)
- Pediatric Dentists
- General Dentists
- Subspecialties
Education & Licensing in WI

Class 1 Permit – Oral conscious sedation
Class 2 Permit – Enteral & parenteral
Class 3 Permit – “Deep sedation, general anesthesia, conscious sedation- parenteral, and conscious sedation-enteral.”

Sedation Requirements in WI

“Operative supervision” means the dentist is in the operatory performing procedures with the aid of qualified staff.”

“Qualified staff” means a person is certified in the administration of basic life support in compliance with the standards set forth by the American Heart Association, the American Red Cross, or other organization approved by the board, and has training in how to monitor vital signs, and how to use a pulse oximeter, blood pressure cuff, and a precordial or a pretracheal stethoscope. If the dentist is administering deep sedation and general anesthesia a person shall also be trained in how to use an EKG.”

Depth of Sedation & General Anesthesia

[Continuum of depth of sedation: definition of general anesthesia and levels of sedation and analgesia]

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>REQUIREMENTS</th>
<th>REQUIREMENTS FOR ROENTGENOGRAPHIC (“IMAGING”) INTERVENTION</th>
<th>REQUIREMENTS FOR SIMULTANEOUS PERIODONTAL TREATMENT</th>
<th>REQUIREMENTS FOR ROENTGENOGRAPHIC (&quot;IMAGING&quot;) INTERVENTION &amp; SIMULTANEOUS PERIODONTAL TREATMENT</th>
<th>REQUIREMENTS FOR PERFORMANCE OF TORSIONAL ANCHOR PLACEMENT INTO DENTAL ROOTS</th>
<th>REQUIREMENTS FOR PERFORMANCE OF TORSIONAL ANCHOR PLACEMENT INTO DENTAL ROOTS &amp; SIMULTANEOUS PERIODONTAL TREATMENT</th>
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<tr>
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<td>Recovery</td>
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</tbody>
</table>

*Continuum of depth of sedation: definition of general anesthesia and levels of sedation and analgesia is based on guidelines issued by the American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists. This webpage contains 4 tables describing various levels of sedation and analgesia.*
Nitrous Oxide in WI

- Dental or Dental Hygienist
- At least 25% oxygen
- BLS certified

Anxiolysis in WI

- BLS certified by AHA
- Administered before or during procedure
- Pt eyes open, appropriately responsive

Conscious Sedation Enteral in WI

- First must obtain Class 1 Permit
  - Board Approved training course – 18 hrs. didactics - physical assessment, conscious sedation enteral, & emergency management
  - Graduate level training
  - 20 cases observed or participated
  - BLS & Approved Airway Course or ACLS
  - PALS (for 14 or under)
Conscious Sedation – Parenteral in WI

- Must obtain a Class 2 Permit
  - Approved Course w/ 60 hrs. didactic – IV sedation, emergency management, physical assessment
  - 20 cases parenteral routes (managed)
  - Graduate level training
  - Utilization of conscious sedation 5 years prior to 2017
  - ACLS or PALS
  - Qualified Staff present – for parenteral route

Deep Sedation and General Anesthesia in WI

- Requires a Class 3 Permit
  - Completion of Board approved post-doctoral training in deep sedation & GA
  - Completion of ACGME Anesthesiology
  - Completion of at least 1 year Anesthesiology Advanced training ADA standards
  - Practiced 5 years GA as a licensed dentist before 2007

Deep Sedation and General Anesthesia in WI

- ACLS or PALS
- Must have qualified staff present throughout procedure
- Nothing to stop the dentist from using an Anesthesiologist, Dental Anesthetist, or CRNA – must remain on premises until returned to consciousness
Office Requirements in WI

- Oxygen, capability of positive pressure ventilation
- Suction & backup
- Chair able to withstand CPR or backboard
- Pulse ox, BP cuff, precordial stethoscope + EKG (deep & GA)
- Emergency Equipment, medications, defibrillator, pocket mask
- Recovery Area (can be same as operating room) w/ approp. equipment

Standards of Care in WI

- Before Sedation – Medical Hx, Allergies, Meds
- Q 5 min BP, HR, SpO2
  - Conscious Sedation – enteral & parenteral
  - Deep Sedation
  - General
- Monitor continuously oxygen, ventilation, & circulation

Standards of Care in WI

- Medications – time, dosage, & route
- Maintain records of anesthesia
- Continuously observed by dentist or qualified staff
- No permit holder will have more than 1 sedated patient
  - Exception – Recovery
Standards of Care in WI

- Deep Sedation & GA require "operative supervision"
- Qualified staff to monitor continuously in recovery room

https://docs.legis.wisconsin.gov/code/admin_code/de/11.pdf

- "Any dentist whose patient lapses into conscious sedation–enteral from anxiolyis shall meet the requirements" of a class 2 permit
- "Unless a dentist holds a class 3 permit, he or she shall not administer any drug that has a narrow margin for maintaining consciousness including, but not limited to, ultra-short acting barbiturates, propofol, ketamine, or any other similarly acting drugs."

https://docs.legis.wisconsin.gov/code/admin_code/de/11.pdf

Reporting of adverse occurrences related to anesthesia administration in WI

- Within 30 days to the Board
- Mortality, temporary or permanent physical or mental injury requiring hospitalization, or a result of anesthesia.
Risks and Complications

Associated Risks

- Sedation and Anesthesia in non-hospital environment (dental or physician office) – Increased incidence of “failure to rescue” from adverse events. (Cote Pediatr Dent 2016;38(4)E13-39)
- Multiple medications leads to trouble

How safe is deep sedation or general anesthesia while providing dental care?
JD Bennett DMD, KJ Kramer DDS, RC Bosack DDS

- OMSNIC insures 80% OMFS
- 2000-2013 – 39,392,008 office based anesthetics
- 113 cases-death or brain injury
- 1 event every 6-4 weeks
- Infer all dentists – exceeds 1/month

Conclusion:
1. Establish patient safety database for anes. M&M

JADA 146 (9), Sept. 2015
Trends in Death Associated with Pediatric Dental Sedation and General Anesthesia
HH Lee, P Milgrom, H Starks, W Burke

- US Media report – death associated with dental procedures
- Categorized depth of anesthesia
- Examined location
- Identified person providing sedation

Results:
1. Most deaths 2-5 y (n=21/44)
2. In office setting (n=21/44)
3. Gen./pediatric dentist (n=25/44)
   - 17/25 linked with sedation/anesthesia

No Centralized Database for Dental Anesthesia/Sedation Complications

- Caleb’s Law Part 1 (2016) – mandated Dental Board of California to collect specified epidemiologic info on adverse events
- Mandated dental board study on sedation safety
- Specified contents of “disclosure form” for parents concerning anesthesia risks

No Centralized Database for Dental Anesthesia/Sedation Complications

- Caleb’s Law Part 2
  - Codify the previous requirements
  - Separate Anesthesia provider for young children – Deep Sedation & General Anesthesia
  - Dental Lobby Challenging
    - Cite Increased Cost
    - Disingenuous – 2 invoices
Anesthesia Standard

Risks and complications

Anesthesiologist Safety Profile

- Wake Up Safe (Sponsored - Society for Pediatric Anesthesia)
- 32 Pediatric Anesthesia Departments
- No Anesthesia related deaths or neurologic injury in 2 million healthy children!

Pediatric 141.4, April 2018
Pediatric Sedation Research Consortium

- 2017
- Collaborative, multi-institutional, multi-disciplinary
- 48 institutions
- No deaths or significant complication in over 500,000 reported cases to date

Consensus Statement

2016 American Academy of Pediatrics & American Academy of Pediatric Dentistry

- Unify guidelines
- Emphasize difference between pediatric and adult pts
- Critical - Practitioners need to recognize deeper levels of sedation and have skilled personnel to rescue the child
Patient Advocacy

Dental Ethics Advocacy

- ADA - Chronic disease management, surveillance, and arrest
- Focus more on prevention (challenge for low socioeconomic)

Dental Ethics Arguments

- Treat diseased teeth with 38% silver diamine fluoride
  - Painted on decay, quick, painless, safe
  - Turns decay areas dark, repeat Q 6 month
- Glass ionomer cement and preformed crowns
  - Antibacterial, prevent new lesions
- “Unethical and wasteful” to not treat early and with advanced disease require GA
Preventable Death of a Child Should Never Occur


Can’t Find a Solution if We Don’t Acknowledge the Problem

- Need to track the Morbidity and Mortality of Dental Sedation
- Only then can we really work to improve patient safety
- Systematic Review – Systems Errors

Anesthesiologist’s Patient Advocacy

- Take the opportunity to advocate for your patient
  - Encourage them to ask questions about monitoring, personnel present, emergency resources
  - Limit scope of practice when appropriate
  - Advocate locally & nationally for a dedicated anesthesiologist sedation provider and against the single provider model
References