

Managing Procedural Pain: Critical Skills for Procedural Sedation

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Our Problem

- Lalwani and Michel – survey of 116 Children's Hospitals
- 66% run credentialing service for non-anesthesiologists.

Anesthesiologists sole sedation providers in 26%.

- Propofol was used regularly by non-anesthesiologists for sedation of non-intubated patients in 42%.

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Further Problems

- The availability of new, potent, short acting agents has generated a huge call for more deep sedation/anesthesia care. Providers of all types want to deliver this care. PSRC data > 25K propofol sedations this year.
- The question remains as to who can/should give sedation using these agents and how does anyone document the ability of a given provider to deliver this care?

Still More Problems.....

- Sedation providers represent a spectrum of education and expertise RN, vs primary care MD vs Critical Care MD vs Anesthesiology.
- How does one design a training course that is appropriate for all of these individuals – when many believe they do not need any training at all?

Our Choices

- Ignore it - hope it goes away.
- Do not participate - but try to legislate against the use of potent medications by other providers.
- Take on all deep sedation.
- Take on the most challenging cases - help design credentialing courses that assure critical competencies and remain engaged.

Sedation Training – Guidance from JCAHO

- Material is directive but not specific.
- Sedation levels are defined.
- Need to be able to rescue from one level deeper than intended level of sedation.
- No guidance for how training should be provided
- Accountability initially linked to anesthesiology departments – now weakened.

Credentialing

- Hospitals assure patient safety and quality of care by verifying from primary sources that individual practitioners meet the organization's minimum requirements for appointment to the medical staff and have the training, education and experience outlined in their application.
- Appointment should be for no more than 2 years.

Privileging

- Defines scope of practice. Gives permission to provide areas of care.
- Healthcare facility must
 - 1) approve a plan to provide a service and
 - 2) determine the criteria for determining which practitioners are qualified to provide the service.

Privileging

- Most providers in one system could not define the meaning of 90% O₂ sat on a pretest for sedation credentialing. Yaster 2000
- ?alarming

Minimal Sedation

- No granting of privileges required – normal cardiovascular and ventilatory function are part of this level of sedation.

Moderate Sedation

- Ventilatory function may be impaired.
- Credentials must be demonstrated and privileges must be granted for this care.
- Practitioners must be able to rescue from one level deeper than that intended.
- ACLS (PALS) may be a requirement
- Alternatively “other courses” that teach airway management may be specified.

Deep Sedation

- Practitioners must be able to manage an unstable cardiovascular system as well as inadequate spontaneous ventilation.
- ACLS or other courses are acceptable
- Performance improvement data demonstrating good patient care verify that policies are effective.

Privileging guidelines for Moderate/Deep Sedation

- Completion of Anesthesiology Residency
- Completion of Nurse Anesthesia Training
- Completion of a residency where training in sedation and experience in supervising sedation is part of the program. Includes cardiology, GI, EM, pulmonologists, surgeons etc.

AAP guidelines for Deep Sedation

- Must have a monitor.
- “At least one person must be present who is trained in pediatric basic life support and who is skilled in airway management and cardiopulmonary resuscitation”.
- Training in Advanced Pediatric Life Support is recommended.

So How Do We Do This?

Sedation Training NRP

- Good for resuscitation - airway intervention
- No training in sedation goals/monitoring etc.

Sedation Training PALS

- Levels of Sedation
- Presedation Assessment (AMPLE)
- NPO Status
- Airway examination described – not detailed.
- Monitoring and record keeping is mentioned
- Medications described.

Sedation Training PALS

- Drugs mentioned in detail – barbiturates, benzodiazepines, opiates. Ketamine, propofol, and Chloral Hydrate each get a paragraph. Reversal agents discussed.
- Discharge criteria mentioned.
- In all, 10 pages of instruction.
- The sedation module is often not included as part of the course at many institutions. To be recreated in 2007.

Sedation Training PALS

- Megacode usually involves unanimated mannequin resuscitation – cardiac arrest.
- No practical sedation related hands on training is included.

Sedation Training APLS

- Includes ACEP terminology for sedation (PSA).
- Includes ASA status.
- Monitoring discussed.
- Extensive Drug list with– all meds imaginable – Local to Etomidate etc.
- Specific explanation of drugs and possible combinations for specific procedures are included.
- Recovery Criteria are mentioned.

Sedation Training APLS

- Hands on portion of the course almost never involves sedation.
- Assumption (I guess) – if the patient codes because of sedation, the practitioner will be capable of rescue based on APLS training.

Sedation Training at Individual Institutions

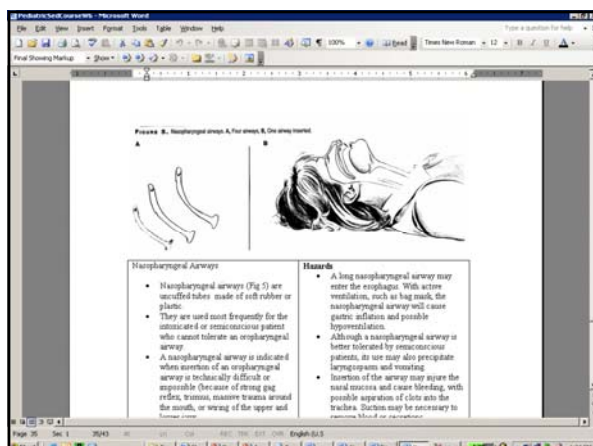
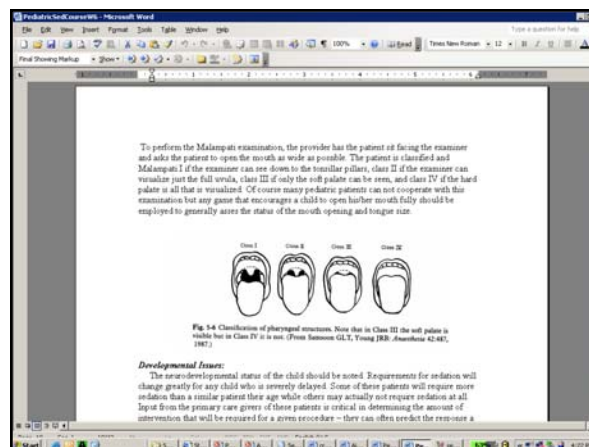
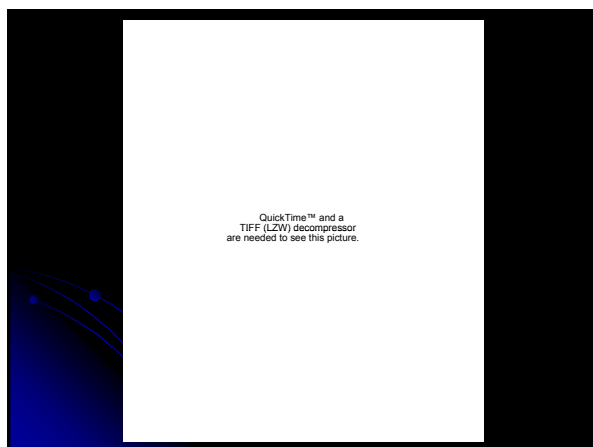
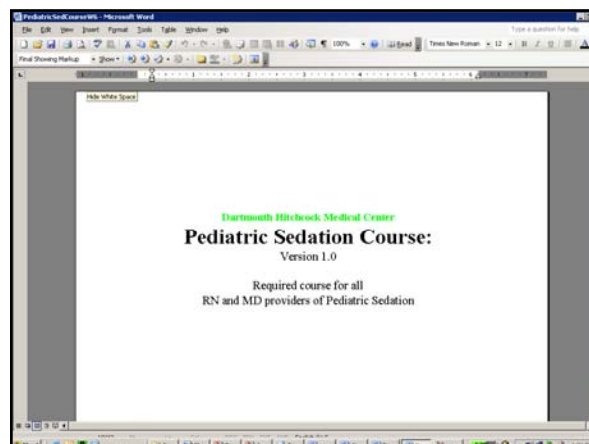
- Didactic knowledge +/- hands on competence
- Almost all include a course that contains info like that of PALS/APLS – preop assessment, monitoring, meds, and recovery criteria.
- Many also include some hands on observation – either in the unit (Rainbow Babies) OR, or on a simulator (Dartmouth and others).
- Some have graduated competencies (Walter Reed AMC)

What Are We Left With?

- Each institution must decide what is appropriate in terms of training and skill level to provide sedation.
- JCAHO gives no guidance on use of specific drugs or what (exactly) is required for training when deep sedation is involved.
- Many models exist that are now in place to meet the need to credential sedation providers

Dartmouth Sedation Credentialing

- Begin with a didactic course that can be read and test taken on line.
- Content can include video training or interactive material. Updates are easy.
- Test of knowledge is embedded in the course material with explanations.
- Emphasize high risk patient factors and high risk procedure factors.



Assuring Quality Care

- Question remains – What are the critical competencies related to sedation provision and how do we document them?
- Can we use evidence to determine these competencies.

Complications Paper

Incidence and Nature of Adverse Events During Pediatric Sedation/Anesthesia for Procedures Outside the Operating Room: Report From the Pediatric Sedation Research Consortium

Joseph P. Coopers, MD^{1,2}, George T. Bilka, MD³, Michael Beach, MD⁴, Susan M. Gallagher, BS⁵, James H. Hertzog, MD⁶, Jason E. Hovelsick, MD⁷, Barry Galbraith, MD⁸, and the Pediatric Sedation Research Consortium

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Selected Results

Adverse Events	Incidence per 10,000	N	95% CI
Death	0.0	0	(0.0-0.0)
Cardiac Arrest	0.3	1	(0.0-1.9)
Aspiration	0.3	1	(0.0-1.9)
Hypothermia	1.3	4	(0.4-3.4)
Seizure (unanticipated) During Sedation	2.7	8	(1.1-5.2)
Stridor	4.3	11	(1.8-6.6)
Laryngospasm	4.3	13	(2.3-7.4)
Wheeze (new onset during sedation)	4.7	14	(2.5-7.8)
Allergic Reaction (rash)	5.7	17	(3.3-9.1)
Intravenous Related Problems/complication	11.0	33	(7.6-15.4)
Prolonged Sedation	13.6	41	(9.8-18.5)
Prolonged Recovery	22.3	67	(17.3-28.3)
Apnea (unexpected)	24.3	73	(19.1-30.5)
Secretions (requiring suction)	41.6	125	(34.7-49.6)
Vomiting During Procedure (non-GI)	47.2	142	(39.8-55.7)
Desaturation \leq below 90%	156.5	470	(142.7-171.2)
Total Adverse Events	339.6 (1 per 29)	1020	(308.1-371.5)

Selected Results

Unplanned Treats	Incidence per 10,000	N	95% CI
Reversal Agent Required - unanticipated	1.7	5	(0.6-3.9)
Emergency Anesthesia Consult for Airway	2.0	6	(0.7-4.3)
Admission to Hospital (unanticipated) (sedation related)	7.0	21	(4.3-10.7)
Intubation Required - unanticipated	9.7	29	(6.5-13.9)
Airway Obstruction (unexpected equipment)	27.6	83	(22.0-34.2)
Bagmask Ventilation (unanticipated)	63.9	192	(55.2-73.6)
Total Unplanned Treatments	111.9 (1 per 89)	336	(85.5-130.2)
Conditions Present During P	Incidence per 10,000	N	95% CI
Inadequate sedation could not complete	88.9 (1 per 338)	267	(78.4-100.2)

Results-Serious AE's

- 0 Deaths
- 1 Cardiac Arrest
- 1 Aspiration
- 24 Stridor and Laryngospasm
- 21 Unplanned admissions
 - ~1 per 1,500 sedations

Results-Serious AE's

- 111 Stridor, Laryngospasm, Wheezing, Apnea
 - ~1 per 400 sedations
- 267 Vomiting, Secretions
 - ~1 per 100 sedations

Results-Unplanned Treatments

- 6 Emergency Anesthesia Consults
- 29 Emergent Intubation
- 83 Oral Airway Insertion
- 192 Positive Pressure BMV
- 310 Unplanned Major Airway Interventions
 - ~1 per 100 sedations

Discussion

- **Primary Findings-**
 - Critical AEs rare (Death, Cardiac Arrest, Aspiration);
 - serious AE's (Laryngospasm, Stridor, Apnea, Bronchospasm) LESS rare
 - ~1:400 sedations
 - Need for Emergent Airway Tx Common (depending on definition)
 - ~1:100 sedations

Do Differences Exist?

- Oh Yea!

Critical Competencies

- **Combine Database Results with Direct Video Observation**

Critical Competencies

- **Assess patient - stratify risk.**
- **Obtain IV access.**
- **Understand drug dosing - titration to effect.**
- **Understand monitors - pro's vs con's - understand how to place - troubleshoot.**
- **Understand how to recognize apnea using several methodologies esp capnography.**

Critical Competencies

- **Open Airway - multiple methodologies - oral airway, nasal airway, jaw thrust, chin lift.**
- **Clear airway - suction, clear physical obstruction etc.**
- **Choose appropriate mask. Place appropriately**
- **Deliver positive pressure ventilation with bag and mask.**

Critical Competencies

- **Call for help.**
- **Recognize all equipment needed for intubation.**
- **Familiarity with intubation technique.**
- **Appropriate Bag-tube ventilation technique.**

Dartmouth Sedation Training

- Hands on training with sedation crisis situations using the simulator. 1) 3 YO with laryngospasm 2) Infant with airway obstruction 3) Adolescent medication error.
- Feedback on critical events using the simulator to recreate events and accompanied by didactic material.

Ongoing Training and Updating

- Critical events are reported and reviewed
- Model events in the simulator
- Reenact the incident
- Overlay with instructional video.

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Summary

- Intellectual training – detailed – video enhanced...
- Critical competencies, hands on training – OR or simulator based.
- ? Tiered sedation delivery privileging.
- Ongoing testing of systems
- Use QI process to model errors and reenact to educate on an ongoing basis.