Conscious Sedation in Electrophysiology

Practical Workshop on Conscious Sedation

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When will sedation be involved?

- Cardioversions
- Insertion of ICDs/PPM
- RFA and EP studies
Drud-induced Absence of response to any stimulus
Loss of protective airway reflexes
Depression of respiration
Disturbance of circulatory reflexes

Monitored Anaesthetic Care

Drug-induced permissiveness of uncomfortable or painful diagnostic or interventional medical or surgical procedures
Lack of memory of distressing events
Analgesia
Conscious Sedation (Moderate Sedation)

- Purposeful response to verbal or tactile stimulation
- No airway intervention required
- Adequate spontaneous ventilation
- Cardiovascular function usually maintained
1. Responsiveness
   - Minimal sedation (Anxiolysis)

2. Airway
   - Moderate sedation/Analgesia

3. Spontaneous ventilation
   - Deep Sedation/Analgesia

4. Cardiovascular function
   - General Anaesthesia
Goal of any anaesthetic intervention

- Patient comfort
- Ideal operating condition
- Patient safety
Conscious Sedation in EPS

Patient discomfort
Patient injury
Adverse physiological and psychological responses

Unintentional loss of consciousness
Loss of protective reflexes
Respiratory depression
Cardiovascular depression
EPS & Conscious Sedation

- Diagnostic +/- therapeutic
- Invasive, complex
- More sophisticated
- Longer duration
- More frequent catheterizations
- High operator concentration
- Special cardiac cath lab

- Allows patients to tolerate unpleasant procedures by relieving anxiety, discomfort, pain
- Minimize patient movement

**Anaesthesia and Sedation Outside the Operating Room ......**
(environment, facilities, equipments, personnel, standard of care....)
Practical Workshop on Conscious Sedation

- To be Practical = to understand what we are doing and the potential risks involved

1. Do no harm
2. Get it done
3. Have contingencies
What could go wrong?

ASA Closed Claims Project - What have we learned, How has it affected practice, and How will it affect practice in the future?

...respiratory system events accounted for a large share of all claims, and an especially large % of claims for death and brain damage

.....The most common events leading to (such) injury were inadequate ventilation, esophageal intubation, and difficult tracheal intubation

Anaesthesiology 1999; 91:552-6
Injury and Liability associated with Monitored Anesthesia Care – a closed claims analysis

- Respiratory depression, after absolute or relative overdose of sedative or opioid drugs, was the most common (25%) specific damaging mechanism in MAC claims.
- 75% received a combination of 2 or more drugs.
- Nearly half of the injuries were judged as preventable by additional or better monitoring.
Non-operating room anaesthesia claims had a higher severity of injury and more substandard care than operating room claims.

Inadequate oxygenation/ventilation was the most common mechanism of injury.

Maintenance of minimum monitoring standards and airway management training is required for staff involved in patient sedation.
1. How to Do No Harm
- Pre-procedure evaluation
- Patient Counseling
- Preoperative preparation

2. How to get it done
- Monitoring
- Choice of agents / Dose Titration
- Personnel / Training

3. How to prepare for contingencies
- Reversal agents
- Emergency Equipment
- Special Situations
Anesthesiology 2002;96:1004-17
Task force to review published evidence obtain opinion of consultant panel build consensus amongst practitioners

- **Strength of scientific evidence**
  - Supportive
  - Suggestive
  - Equivocal

- **Lack of scientific evidence**
  - Inconclusive
  - Insufficient
  - Silent

- **Survey responses from consultants for specified issues**
  - Strongly agree (5) to
  - Strongly disagree (1)
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Guidelines on Sedation and/or Analgesia for Diagnostic and Interventional Medical and Surgical Procedures

Guidelines - defined as a ‘document offering advice’
1. Pre-procedure evaluation & Patient counseling

- Relevant history –
  - major organ systems, sedation-anaesthesia history, medications, allergies, last oral intake

- Physical exam –
  - Heart, lung, airway

- Lab tests

- Discuss with patient risks, benefits, limitations, and alternatives

insufficient evidence, strongly agreed, recommended
Airway assessment for sedation and analgesia

- Previous problems, stridor, snoring, sleep apnea
- Advanced rheumatoid arthritis, chromosomal abnormality, significant obesity
- Short neck, limited neck extension, decreased (<3 cm) hyoid-mental distance, neck mass, cervical spine problems, dysmorphic facial features
- Small mouth opening (<3 cm), dentition, receding chin

Case example
2. Pre-procedure fasting

insufficient evidence, strongly agreed, recommended

- Elective procedures – sufficient time for gastric emptying
- Urgent or emergent situations – potential for pulmonary aspiration considered in determining target level of sedation, delay of procedure, protection of trachea by intubation
- Fasting guidelines – clear liquids 2h, nonhuman milk and light meal 6h, fatty foods or meat may need longer
- Careful transfer
- Ensure patient comfort
- Proper positioning especially head and neck for the long procedure
- Protection of limbs and pressure points
- Patient kept warm
- Let patient know what is going on – simple words/ simple actions can do
3. Monitoring level of consciousness, pulmonary ventilation, oxygenation & haemodynamics

- ECG, Blood pressure and heart rate
- Response to verbal commands
- Pulse oximetry*
- Pulmonary ventilation*
  - Observation, auscultation
  - Exhaled CO2 monitoring
- Data record at appropriate intervals before, during, after procedure
Monitoring of pulmonary ventilation vs monitoring of oxygenation

- Ventilation and oxygenation are separate (though related) physiological processes
- Detection of apnea or hypoventilation may be delayed in patients receiving supplemental O2 during MAC
  - Downs JB Respir Care 2003; 48(6):611-20
Monitoring of End-tidal CO₂
ETCO2 monitoring during sedation
Apnea lasting 20 s or more is common in patients undergoing MAC and is not easily noticed by sedation providers but can be detected by nasal end-tidal CO2 monitoring.

Higher O2 flow rates decreased amplitude of capnograph but do not interfere apnea detection.

- SpO2 & pulse oximetry detects peripheral tissue oxygen saturation and hypoxaemia.
- Variable pitch ‘beep’ gives continuous audible indication of oxygen saturation.
- Supplemental O2 - increased margin of safety, but delayed diagnosis of hypoventilation.

4. Personnel and Training

- Designated individual, other than the practitioner performing the procedure
- To monitor the patient throughout the procedure
- May/may not assist with other tasks

- Pharmacology of sedative and analgesic agents
- Pharmacology of available antagonists
- BLS
- ACLS
APPENDIX III

Personnel for Procedural Sedation and Analgesia

Scenario 1: Three practitioners – Sedation by Proceduralist

- Medical practitioner proceduralist with airway and resuscitation skills, and training in sedation
- Practitioner with training in monitoring sedation
- Assistant to assist both
- Conscious sedation in ASA P 1-2 patients
- Propofol, thiopentone and other intravenous anaesthetic agents must not be used

Scenario 2: Three practitioners – Sedation by Medical Practitioner

- Proceduralist
- Medical practitioner with airway and resuscitation skills, and training in sedation
- Assistant to assist both
- Conscious sedation in ASA P 1-2 patients
- Propofol, thiopentone and other intravenous anaesthetic agents may only be used by a medical practitioner trained in their use

Scenario 3: Four practitioners – Sedation by Medical Practitioner

- Proceduralist
- Medical practitioner with airway and resuscitation skills, and training in sedation
- Assistant to assist each*
- Conscious sedation in ASA P 1-3 patients**
- Propofol, thiopentone and other intravenous anaesthetic agents may only be used by a medical practitioner trained in their use
Scenario 4: Three practitioners – Sedation by Anaesthetist

- Proceduralist
- Anaesthetist
- Assistant to assist both
- Conscious, deep sedation or general anaesthesia in all patients
- All approved anaesthetic drugs may be used

Scenario 5: Four practitioners – Sedation by Anaesthetist

- Proceduralist
- Anaesthetist
- Assistant to assist each*
- Conscious sedation, deep sedation or general anaesthesia in all patients
- All approved anaesthetic drugs may be used

*Recommended if assistance is likely to be required for the majority of the case (e.g. complex or emergency patients)
5. Equipments

- Prepare for emergencies
  - Suction
  - Airway equipments
  - Means of positive-pressure ventilation
  - Basic resuscitative medications
  - Defibrillator

- Oxygen delivery equipment
- Oxygen supplement
  - Routine/If hypoxemic
6. Choice of agents, dose titration, intravenous access

- sedatives/analgesics, bolus/infusion
- (can consider oral premedication)
- Medications given incrementally with sufficient time between doses to assess effects
- Appropriate dose reduction if both sedatives and analgesics used
- (especially in elderly & patients with other organ disease)
Ideal drug for sedation/analgesia

- Free of serious adverse effects
- Not associated with significant drug interactions
- Dose not accumulate with repeated dosing even in presence of organ dysfunction
- Easy to administer
- Quick and predictable onset and dissipation of effect
- The drug(s) YOU are familiar and experienced with
Caution!  

- Intravenous anaesthetic agents such as propofol must only be used by a second medical practitioner trained in their use because of the risk of unintentional loss of consciousness. These agents must not be administered by the proceduralist.

Unconscious Sedation/analgesia with propofol versus conscious sedation with fentanyl/midazolam for catheter ablation of AF: a prospective, randomized study

Tang et al Chin Med J 2007;120(22):2036-8
If Patients become hypoxaemic/apneic during sedation:

1. encouraged or stimulated to breathe deeply
2. Receive supplemental oxygen
3. Receive positive pressure ventilation if spontaneous ventilation is inadequate
4. Pharmacological reversal
7. Reversal agents

- Naloxone and flumazenil available whenever opioids or benzodiazepines administered – especially helpful in cases where airway control and positive pressure ventilation are difficult.

- Prolong observation after pharmacological reversal to ensure respiratory depression does not recur.

- Routine use of reversal.
8. Recovery

- Observation until patients no longer at risk for cardio-respiratory depression
- Appropriate discharge criteria
9. Special situations

- Severe underlying medical problems
  - Appropriate consultations/ modification of techniques
- Risk of severe cardiovascular or respiratory compromise or need for complete unresponsiveness to obtain adequate operating conditions
  - Consult anaesthesiologists
Training in procedural sedation and/or analgesia for non-anaesthetist medical practitioners

- A minimum period of full time equivalent supervised training in procedural sedation/analgesia and anaesthesia
- A longstanding clinical experience as equivalent
- Credentialling, training and clinical support of such medical practitioners - close cooperation from anaesthetists in the hospital
Be vigilant, adhere to safe practices

Is your own setting optimum to provide safe sedation/anaesthesia for the relevant procedures?

What is the suitable training for non-anaesthesiologists to provide/assist safe sedation?