Alternatives to Sedation in the EEG Lab

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The use of sedation in EEG labs is becoming less and less common. We recently discontinued the use of sedation in our lab and we were probably one of the last holdouts using chloral hydrate. Sedation can be helpful in getting uncooperative patients hooked up as well as achieving sleep recordings. But frankly, I never found low doses of chloral hydrate very helpful in getting patients, particularly kids, to cooperate. It may make them sleepy but not particularly cooperative. Child-friendly, creative techniques or an entrancing video are more useful, in my experience.

The American Academy of Pediatrics (AAP) guidelines on sedation are hard for the average EEG lab to meet. Among other things these guidelines require:

- a medical exam prior to the procedure.
- presence of a nurse or doctor skilled in airway management and CPR.
- monitoring of vital signs every 5 minutes, if deep sedation occurs.
- extended observation after the procedure.

The guidelines were published in Pediatrics, Vol. 110, No 4 (October) 2002 and can be seen on-line at the AAP website or http://aappolicy.aapublications.org/cgi/content/full/pediatrics;110/4/836.

Sleep deprivation is probably the simplest alternative to sedation. However, it may not be appropriate for all situations. Sleep deprivation may lower some patients’ seizure threshold. Sleep deprived patients may have accidents driving. Also, good wake recordings may be impossible if the patient is too sleepy.

One strategy for attaching electrodes on difficult patients is to let an anesthesiologist sedate the patient. If an MRI is planned, have them keep the patient asleep until you get the electrodes on. Of course anesthesia will mask most EEG abnormalities but this can be overcome by using short term anesthetics and recording the patient overnight in an epilepsy monitoring unit. Needless to say, this is very expensive and probably overkill if all that is needed is a routine EEG.

An ambulatory EEG can be used to capture sleep. Everyone sleeps sooner or later. The disadvantages here are inconvenience to the patient and cost. One of our pediatric neurologists orders ambulatory EEG’s to follow routine EEG’s if the patient does not fall asleep in the lab. This could be a big problem for users of ambulatory recorders that require a unique electrode harness. This can be overcome by getting an “all socket harness.” This harness allows you to plug standard electrodes into the ambulatory recorder and avoid having to rehook the patient.

A very encouraging study recently found music therapy twice as effective as chloral hydrate for inducing sleep in children during EEG’s. The study was published in the Journal of PeriAnesthesia Nursing, Vol. 20, No. 5 (October) 2005. The title of the article is “Sleep/Sedation in Children Undergoing EEG Testing: A Comparison of Chloral Hydrate and Music Therapy.” The music therapy described in the article consisted of skilled music therapists strumming guitars and singing in synchrony with the patient’s breathing. This was compared to 60 mg/kg doses of chloral hydrate. Sixty children, ages 1 through 5, were studied. All were sleep deprived. Music therapy worked 97% of the time. Chloral hydrate worked 50% of the time. Music therapy also put the kids to sleep faster than chloral hydrate. We are hoping to reprint this article in the American Journal of Electroencephalography Technology in the December issue.

I was so impressed by this article that I started investigating the possibility of music therapy in my lab. We have been using lullaby tapes with a heartbeat in the background for decades but with only modest effect. Here are some of the things I have discovered.

- Music therapy is a profession. Substituting other musicians or prerecorded music is unlikely to be as effective.
- There are no music therapy schools in my area, but there may be in yours. An internet search found 70 music therapy schools in 30 states. Check out http://members.aol.com/kathysl/usschools.html. Perhaps music therapy programs are looking for hospitals to do internships. This might be a way to experiment with using this technique at no cost to your institution.
- Music therapy is cost effective and useful to many departments. An article in the June 6, 2005 issue of U.S. News and World Report reported that music therapy is being used in neonatal ICUs, during echocardiograms, and following surgery. The article describes cost savings where music therapy reduced hospital days, eliminated the need for nurses to be present during sedation, and reduced the amount of pain medications that patients required. Music therapy even helped premature infants breathe better and gain weight. This article can be found at www.usnews.com/usnews/health/articles/060605/5art_3.htm.

Another innovative alternative to sedation might be hypnosis. Although poorly understood, hypnosis has been used as an alternative to anesthesia in many settings including surgery. One of the best and easiest applications of hypnosis is to induce relaxation and sleep. Hypnosis training is not uncommon in Psychology and Psychiatry education. Your hospital may have a clinician on staff who has received such training. Could they be persuaded to...
patient’s head. I bring the wrap around circumferentially. I then place the vertex electrodes and complete the wrap. I add ear electrodes and other physiological electrodes after the head wrap is complete. Should an electrode have moved or is artifactual, I use an applicator to make a hole in the gauze at the electrode site. I place a new electrode and tape it in place. I leave the old electrode unplugged.

I believe that having a patient crying for fifteen minutes is still preferable to sedation. I explain the test and possibilities to the parents prior to touching the patient. I try to present a calm and confident demeanor no matter how I might be feeling on the inside. I reassure parents that their child is behaving appropriately for their age. There are cases where you want sedation, especially for you and the parents.

Child Life Specialists have been trained to ease the stress of testing for pediatric patients. Recently there has been considerable research about music therapy versus sedation and pain management. All the research has demonstrated the same positive results across all age groups. Most of these studies have utilized the services of a certified music therapist. The therapist selects live music to play and sing appropriate for the patient’s age and cultural background. This may include entrainment to match a patient’s breathing rate and/or heart rate to allow the patient to relax.

I have tried singing a few times to my patients but also realize that this is best left to the certified music therapist. Unfortunately, there are no certified music therapists at my facility.

I do believe we can all evaluate our labs to ensure we achieve our goals of obtaining sleep without sedation. Try to locate a comfortable bed and mattress and send those stretchers back to storage. Ask around to see if there are any beds in your hospital storage you can have. Our electric beds are very old, but work great and have comfortable mattresses. If necessary invite your manager/administrator to come in and get an EEG. Once they have tossed around on that old stretcher they might be willing to help you out.

I believe it is very important to allow your patients to get comfortable. Give them as many pillows as required. Pile on the blankets if necessary. I keep the thermostat all the way down so the lab stays cool. I use paste and cotton balls/gauze squares and have very little problem with electrodes staying on or moving around. I do wrap toddlers and some children’s heads so they can move around.

Allow your parents to lie down with their child if that works best. Make sure they are comfortable also. Children are very sensitive to stress and feel their parents’ anxiety and even your own anxiety. When the parents begin to relax, the child will usually relax also. Offer your pediatric patients as many choices as possible; it helps them feel more in control. Let them choose what color china marker you use, where Mom and Dad sit, and what movie/show they want to watch. Do they want a nightlight left on? I often ask parents to leave the room after hook up if the patient is eight or older. Of course this is the patient’s choice.

Evaluate your resources at your facility. If you have a Child Life Specialist or Certified Music Therapist utilize them. Consider getting a multi-media TV to help your patients relax and feel comfortable. Look through the Internet or local stores for music that has been designed to promote sleep. At first, I used CDs with nature sounds. I found this was soothing, have them stare at the checkerboard pattern reversal stimulation induce drowsiness? Next time an EEG patient has trouble sleeping, have them stare at the pattern for 5 or 10 minutes and find out. If successful, this technique could get a little more use out of all those VEP systems that are gathering dust since MRI took over.

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induce sleep for an occasional EEG patient? Okay, I am reaching here, but hypnosis induction tapes are widely available and may be effective in some individuals.

Maybe the answer to our no-more-sedation problem is right under our noses. How often have you had trouble keeping your patients awake during visual evoked potentials? Does checkerboard pattern reversal stimulation induce drowsiness? Next time an EEG patient has trouble sleeping, have them stare at the pattern for 5 or 10 minutes and find out. If successful, this technique could get a little more use out of all those VEP systems that are gathering dust since MRI took over.

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